

Chemistry International

**The news magazine of the International Union of
Pure and Applied Chemistry (IUPAC)**



2000, Vol. 22, No. 1 (January)



- 1 **Environmental Problems of Greece from a Chemical Point of View**
- 1 **Millennium Message**
- 7 **News from IUPAC**
- 7 Japanese Version of IUPAC, IUPHAR, and IUTOX Report on Natural and Anthropogenic Environmental Oestrogens: The Scientific Basis for Risk Assessment
- 7 IUPAC Observer's Report on the Ninth Meeting of the IPCS Program Advisory Committee, Berlin, Germany, 5–8 October 1998
- 11 **News and Notices from Other Societies and Unions**
- 11 The Morbidity and Mortality of Scientific Illiteracy
- 13 Report of First Annual Meeting of National Authority Representatives and First Meeting of Chemical Industry Representatives Organization for the Prohibition of Chemical Weapons (OPCW), The Hague, Netherlands, 26–27 June 1999
- 17 **Reports from IUPAC-Sponsored Symposia**
- 23 **New Books and Publications**
- 25 **Awards and Prizes**
- 25 **Conference Announcements**
- 29 **Conference Calendar**

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)



Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

PUBLICATIONS MANAGER: Alan J. Senzel
PRODUCTION EDITOR: Cheryl Wurzbacher

All correspondence to be addressed to The Editor, *Chemistry International* (CI), IUPAC Secretariat, P. O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Telephone: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: edit.ci@iupac.org and <http://www.iupac.org/publications/ci/>

Subscriptions

Six issues of *Chemistry International* (ISSN 0193-6484) will be published bimonthly in 2000 (one volume per annum) in January, March, May, July, September, and November. The 2000 subscription rate is USD 99.00 for organizations and USD 45.00 for individuals. Subscription orders may be placed directly with the IUPAC Secretariat. Affiliate Members receive *CI* as part of their Membership subscription, and Members of IUPAC bodies receive *CI* free of charge.

Reproduction of Articles

Unless there is a footnote to the contrary, reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original in *Chemistry International*.

Periodicals postage paid at Durham, NC 27709-9998 and additional mailing offices. POSTMASTER: Send address changes to *Chemistry International*, IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757.

Front cover: The unique geography of Greece is discussed in the article "Environmental Problems of Greece from a Chemical Point of View" on page 1.

Printed by: Cadmus Journal Services, Easton, MD, USA

International Union of Pure and Applied Chemistry

International Union of Pure and Applied Chemistry (IUPAC)



President: A. HAYES (UK)
Vice-President: P. S. STEYN (South Africa)
Past-President: J. JORTNER (Israel)

Secretary-General: E. D. BECKER (USA)
Treasurer: C. BUXTORF (Switzerland)

IUPAC Secretariat

P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Tel.: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: secretariat@iupac.org and <http://www.iupac.org>

The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary non-governmental, nonprofit association of organizations, each of which represents the chemists of a member country. Its objectives are as follows:

- to promote continuing cooperation among the chemists of the member countries
- to study topics of international importance to pure and applied chemistry which need standardization or codification
- to cooperate with other international organizations that deal with topics of a chemical nature
- to contribute to the advancement and understanding of pure and applied chemistry in all its aspects

The membership of IUPAC currently comprises 45 national organizations.

National Adhering Organizations

Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Österreichische Akademie der Wissenschaften (**Austria**)
Nationaal Comité voor Scheikunde/Comité National de Chimie (**Belgium**)
Brazilian Chemistry Committee for IUPAC (**Brazil**)
Bulgarian Academy of Sciences (**Bulgaria**)
National Research Council of Canada (**Canada**)
Sociedad Chilena de Química (**Chile**)
Chinese Chemical Society, Beijing (**China**)
Chemical Society located in Taipei (**China**)
Croatian Chemical Society (**Croatia**)
Czech National Committee for Chemistry (**Czech Republic**)
Det Kongelige Danske Videnskabernes Selskab (**Denmark**)
Academy of Scientific Research and Technology (**Egypt**)
Suomen Kemian Seura (**Finland**)
Comité National Français de la Chimie (**France**)
Deutscher Zentrallausschuss für Chemie (**Germany**)
Association of Greek Chemists (**Greece**)
Hungarian Academy of Sciences (**Hungary**)
Indian National Science Academy (**India**)
Royal Irish Academy (**Ireland**)
Israel Academy of Sciences and Humanities (**Israel**)
Consiglio Nazionale delle Ricerche (**Italy**)

Science Council of Japan (**Japan**)
Korean Chemical Society (**Korea**)
Kuwait Chemical Society (**Kuwait**)
Koninklijke Nederlandse Chemische Vereniging (**Netherlands**)
Royal Society of New Zealand (**New Zealand**)
Norsk Kjemisk Selskap (**Norway**)
Chemical Society of Pakistan (**Pakistan**)
Polska Akademia Nauk (**Poland**)
Sociedade Portuguesa de Química (**Portugal**)
Colegio de Químicos de Puerto Rico (**Puerto Rico**)
Russian Academy of Sciences (**Russia**)
King Abdulaziz City for Science and Technology (**Saudi Arabia**)
Slovak Chemical Society (**Slovakia**)
Slovenian Chemical Society (**Slovenia**)
National Research Foundation (**South Africa**)
Consejo Superior de Investigaciones Científicas (**Spain**)
Svenska Nationalkommittén för Kemi (**Sweden**)
Neue Schweizerische Chemische Gesellschaft (**Switzerland**)
Türkiye Kimya Dernegi (**Turkey**)
Royal Society of Chemistry (**United Kingdom**)
National Research Council, National Academy of Sciences (**USA**)
Union of Yugoslav Chemical Societies (**Yugoslavia**)

Environmental Problems of Greece from a Chemical Point of View

Assistant Professor M. Dassenakis (Department of Chemistry, Inorganic and Environmental Chemistry, University of Athens, Panepistimioipolis, Athens 15771, Greece; E-mail: edasenak@atlas.uoa.gr) prepared this article on behalf of the IUPAC Commission on Soil and Water Chemistry (VI.3). We thank the Commission Secretary, Dr. Willie J. G. M. Peijnenburg (E-mail: WJGM.Peijnenburg@rivm.nl), for helping to facilitate publication of this contribution.

General Environmental Characteristics of Greece

Greece, owing to its geomorphology and its fragmented structure, has an extremely wide range of environments with a vast variety of natural conditions, including high mountainous areas as well as subtropical regions. Its mountains, many of which exceed 2 000 m in height, provide all kinds of conditions with a large variety of woods, fields, and rocks; its lowlands include wide river deltas and lagoons. Greece has also many lakes and streams. Some large rivers in northern Greece (the Axios, Strimon, Nestos, and Evros) enter from the Balkan Peninsula, crossing two or more countries.

Greece's total coastline amounts to about 15 000 km (7 300 km continental and 7 700 km islands), and it is the longest in the Mediterranean region. Greece has more than 2 000 islands with rocky or sandy coasts, duns, caves, bushes, and woods, scattered from the North Ionian Sea to the southernmost point of Europe (Gavdos Island) to the easternmost point of Europe (Castellorizon Island). Areas of more than 2 000 m in depth exist in the Greek seas.

Because of such a diversity of microenvironments, the country supports some of the richest floras and faunas in Europe. It contains more than

- 6 000 species of higher plants,
- 110 species of mammals,
- 400 species of birds,
- 100 species of freshwater fish, and
- 60 species of reptiles.

Over the last century, and especially after the 1960s, a significant move of population toward the coastal areas took place as these areas experienced increased economic development, mainly through tourism, industry, transport, and agriculture. This expansion and in-

Millennium Message

Dear Colleagues,

The 20th century has been wonderful and exciting for chemistry and for IUPAC. It is difficult to comprehend the progress that has been made and to appreciate that we now stand within a year or two of seeing the structure of the whole human genome—surely the ultimate achievement in natural product chemistry.

In the 20th century, chemistry came of age, and IUPAC was born and quickly became the world authority on standards, nomenclature, and the validation of essential data for the enabling science—chemistry. These developments were made possible only by the hard work of the devoted volunteers who have unselfishly given their support and personal time and efforts since IUPAC was formed.

Now we stand on the threshold of an exciting new period, and when we look at IUPAC, we see an organization that has had the courage to examine what it does and how it does it. The need for change has been seized, but also it has been recognized that many of the founding values still hold true and that several essential activities still require continuity of effort and personnel.

We have broadened our vision and revitalized our purpose so that we face the exciting challenges with confidence and enthusiasm.

I am extremely honored to be the first President in the new millennium, and I wish you every success in your professional activities and you and your families a happy and healthy New Year, Century, and Millennium!

Dr. Alan Hayes, President of IUPAC

tensification of economic development activities has increased environmental problems and threats to Greece's wildlife, leading to a considerable decrease in the number of many species. The most serious threats for the fauna are draining of wetlands, extensive tree cutting, land clearing due to forest fires, development of coastal housing and tourist installations, and construction on mountains. Increased emissions of various kinds of pollutants and pollution of air, water, and soil have also been recognized as significant problems.

Greece's total population is about 10 million. About 89.7% of the population lives in the coastal region, which makes up 76% of the total land area (population density is about 78/km² or 0.6/km of coast). Total population of the coastal cities in Greece is about 7 million, but it increases to more than 10 million during the summer tourism season. Population density in Greece is generally lower than that of North Europe, but it is high in the Attiki and Thessaloniki regions where half of the Greek population is concentrated. The urbanization rate in 1985 was 60%, but it is estimated that by the year 2000 it will be 68%.

Land use by main category in Greece in 1994 was as follows:

Arable land	17 %
Permanent crops	8.2 %
Wooded areas	22.3 %
Permanent grassland	13.6 %
Built-up land	3.7 %
Other areas	35.2 %

Main Problems in the Greek Environment

Environments and ecosystems in Greece are small and fragile and face many problems of various types. Their study, protection, and management according to the principles of sustainability are difficult tasks. Unfortunately, the priorities of a well-documented and low-cost environmental policy have yet to be defined. Social pressures for better environmental quality are still low, although many economic activities are directly dependent on having a cleaner environment.

Although chemists play an important role in the environmental affairs of Greece, there are many problems involved in arranging the cooperation of scientists working in this field. Chemists, biologists, geologists, engineers, etc., each have different scientific approaches and different professional perspectives. There are inevitably conflicts about work responsibilities and distribution of funds that make planning and implementation of environmental policy difficult.

Environmental education of Greek chemists is considered adequate. All undergraduate chemistry department curricula include courses related to the environment, and there are also postgraduate courses. However, the Greek Chemical Society has yet to prove that

it can work effectively in the monitoring, protection, and management of the environment.

Principal environmental problems in fields related to chemistry and chemists are discussed briefly below.

Agriculture

Agriculture is a significant activity in Greece, and increasing quantities of fertilizers and pesticides are consumed as the practices of intensive agriculture are followed by farmers. Greek population employed in agriculture in 1985 was 2 600 000, which, at 26% of the total population, represents the highest percentage in the European Union.

Consumption of pesticides in Greece during 1989 was 7 811 t, but this quantity may have significantly increased since then. Consumption by main category of pesticide in 1989 was as follows:

Fungicides	1 925 t
Herbicides	3 031 t
Insecticides	2 844 t
Other	11 t

Some observations of elevated concentrations of pesticides in plants and animals have been recorded during the last few years, and there are specialized chemical laboratories dealing with the control of the pesticides in agricultural products, but much work remains to be done to establish an effective monitoring system in this field.

Fertilizer consumption for 1994 was 535 000 t (171.3 t/ha/y), broken down as follows:

Nitrogen	334 000 t N
Phosphate	144 000 t P ₂ O ₅
Potash	57 000 t K ₂ O

Significant nitrogen and phosphorus loads are also generated by the livestock population. These loads are estimated to be 145 000 t N and 27 000 t P annually. The quantities that are transferred into the sea are estimated to be 5 000–15 000 t P/y and 30 000–130 000 t N/y.

Intensive agriculture, farming, and municipal wastes are the main causes for the observation of red tides along Greek coasts and for eutrophication of Greek lakes.

The main rivers of the Balkan peninsula discharge their load into the northern section of the Aegean Sea. Their mean discharge is about 1 000 m³/sec, which carries into the sea about 170 000 t N/y, 23 000 t P/y, and 45–60 Mt of suspended sediments/y. Black Sea water, which enters the Aegean Sea through the Dardanelles, also contributes to the enrichment of the Aegean Sea's nutrients.

River outflow has been significantly reduced during the last 20 years because of the construction of hydroelectric dams and the establishment of irrigation systems. Irrigated land has almost doubled in the period 1970–1990; it is now about 30% of the total. The

reduction of the sediment load of the rivers leads to increased beach erosion, to loss of deltaic environments and wetlands, and to changes in offshore profile and shelf transport processes. The inflow of saline water into river beds during the summer and the formation of salt wedges also disturb the estuarine ecosystems.

Soil erosion data for 1987 indicate that this common Mediterranean problem is severe and excessive; over 4 700 000 ha (35.6% of the total Greek land area) and over 800 000 ha of arable land (30% of the total) suffer from soil erosion.

Wastes

Different kinds of solid and liquid wastes pose significant environmental problems in Greece, because there is not a sufficient system for their management. Landfill is the principal treatment for solid wastes, but a large percentage of these wastes are disposed in areas without proper specifications. Many forest fires have been caused because of this practice.

Significant quantities of liquid wastes are also disposed of at sea or in lakes without any pretreatment. These quantities have been reduced during the last few years through the establishment of wastewater treatment plants in many coastal cities.

Waste generation by the industrial sector for 1990 was as follows:

Agriculture	90 000 t
Mining	3 900 000 t
Manufacturing industry	4 300 000 t
Energy production	7 680 000 t

Municipal waste generated during 1992 amounted to 3 200 000 t (310 kg per capita) of the following composition:

Paper and paperboard	20%
Food and garden waste	48%
Plastics	9%
Glass	5%
Metals	5%
Textiles and other	13%

Treatment methods employed for this waste were as follows:

Landfill	2 970 000 t
Recycling (paper and glass)	226 000 t

Production of hazardous waste for 1992 was as follows:

Waste oil	60 000 t
Waste containing PCBs	1 600 t
Clinical and pharmaceutical wastes	15 000 t
Organic solvents	21 000 t
Paints and pigments	6 000 t
Resins and latex	150 t

Municipal wastewater for 1996 ($5.12 \times 10^8 \text{ m}^3/\text{y}$) was disposed of as follows:

Untreated	43.5%
After primary treatment	42.2%
After secondary treatment	14.3%

Into the sea or rivers through

municipal sewer systems	$3.74 \times 10^8 \text{ m}^3/\text{y}$
Onto land	$0.5 \times 10^6 \text{ m}^3/\text{y}$
Into subsoil	$1.36 \times 10^8 \text{ m}^3/\text{y}$
In irrigation ponds	$1.5 \times 10^6 \text{ m}^3/\text{y}$

Air Pollution

Air pollution began to be a problem in Greece after World War II, owing to a burgeoning rate of industrialization, intense urbanization, and economic growth. Problems are greatest in the major cities (Athens, Thessaloniki, Patra, Iraklio, etc.).

Athens has the worst atmospheric pollution problem, mainly because 40% of the population of the country is concentrated there, leading to the existence of a large number of sources in a small area, and because meteorological conditions in the area favor photochemical reactions (air pollution of the Los Angeles type). Some years ago the main sources of air pollution in Athens were industry and central heating, but over the last few years automobile traffic has accounted for most of the air pollution. The absence of an adequate road network and of adequate public transportation creates intense traffic problems; the speed of vehicles is very low in the city center, where the vehicle composition is 80–85% private cars and taxis, 6–10% buses, and 6–14% motorcycles.

Other regions where air pollution has become an important problem are the industrial zone of Elefsis (near Athens) and the zones of Ptolemais (in Macedonia) and Megalopoli (in Peloponesos), where the main power plants of the country that use lignite as a fuel are located.

In Greece, total energy production is 24 000 000 t oil equivalent, derived from the following sources:

Lignite	35%
Petroleum	60%
Other	5%

Total renewable energy is 1 700 000 t oil equivalent, and hydroelectric energy is 220 000 t oil equivalent.

Another point that must be taken into account in Greece is the possible influence of the greenhouse effect and the world climate change on the coastal zone. It is possible that the islands and coasts could be dangerously threatened by the elevation of the sea level. Emissions of greenhouse gases in Greece are rather

Table 1. Pollutant Emissions in Greece

	SO ₂	NO ₂	NMVOC	CH ₄	CO	CO ₂	N ₂ O	NH ₃
Public power	329.4	111.5	1	1	6	50 734	6,891	0
Commercial combustion	37.8	1.4	0	0	1	1 959	417	0
Industrial combustion	26.8	2.6	0	0	0	1 392	98	0
Production processes	50.6	33.6	22	1	25	8 116	2 720	10 558
Extraction–distribution of fuels	0	0	4	364	0	0	0	0
Solvent use	0	0	82	0	0	0	0	0
Road transport	13.4	113.9	137	4	704	10 358	342	139
Other mobile sources	182.2	272.4	47	1	66	1 217	439	0
Waste treatment–disposal	0	0	0	202	0	606	0	0
Agriculture	0	7.4	32	363	341	1	12 716	460 601
Nature	0.9	1.1	393	4 572	0	7 241	181 604	0
Total	641.2	543.9	718	5 508	1 143	81 804	205 227	471 298

small compared to those in North Europe, but they are still a worldwide problem.

Table 1 shows pollutant emissions in Greece by source.

Air pollution is also correlated to the destruction of forests, mainly by fires. Forest fires annually destroy areas that range from 25 000–120 000 ha, while reforestation hardly covers areas more than 5 000 ha per year. The consequences can now be seen, and many people are becoming aware of the extent of the problem, especially since fires in recent years (1998 included) have threatened large urban areas. Unfortunately, most fires are caused by arson; only a few can be traced to natural causes. Although there is a strict policy of vigilance to prevent arson, the ecological damage stemming from forest fires continues to be very high.

Marine Pollution

The significance of the marine environment is obvious in a country like Greece. Most of the environmental problems of the Greek seas are concentrated close to the large cities. Many facilities scheduled for pollution control have either been delayed or ineffectively designed. As a result, in many areas the levels of heavy metals, organic pollutants, and nutrient concentrations are quite high. Many semi-enclosed gulfs suffer seasonally from eutrophication and anoxic conditions, and oil spills and litter have frequently despoiled Greek beaches in recent years.

During a typical year (1995), there are records of about 300 pollution events (most of them small) along the Greek coast, attributed to the following causes:

- 71 events could be traced to ships,
- 70 were from land-based sources,
- 9 were from other sources, and
- 145 were of unknown origin.

Furthermore,

- 209 events concerned hydrocarbons,
- 61 involved urban effluents,
- 6 concerned solid wastes,
- 5 were associated with other chemicals, and
- 2 involved color substances.

Sixty-nine of these events required use of antipollution equipment (ships, chemicals, skimmers, gathering systems, etc.) by the Greek coast guard to prevent damage to the marine environment.

During the period 1991–1993, Greek courts have ordered those responsible for more than 1 000 pollution events (approximately 650 from ships and 350 from land-based sources) to pay more than a billion drachmas (about USD 400 million) in damages.

Petroleum escaping into the sea from land-based sources and also from marine activities has been reduced in the Mediterranean after the implementation of the MAR-POL convention, but some accidents have caused environmental damage. Since 1980, ten significant accidents (more than 500 t of petroleum discharged into the sea) have occurred in different regions of the Aegean. Pollution from petroleum has led to observation of tar balls along almost every coastline. The wide range of polynuclear aromatic hydrocarbon (PAH) concentrations measured in the Aegean indicates that the most significant pollution remains restricted to near the shore and to enclosed areas.

The inadequate cooperation between Greece and Turkey is an impediment to efforts for protection of the marine environment in the area. The debate between the two countries has a long historical background, but it is also related to management of the wealth of the continental shelf of the Aegean Sea.

Regarding the quality of bathing water, it is well known that the Aegean Sea is one of the main tourist

areas of the Mediterranean; thus, seawater quality has an important significance for vacationers. There is a systematic monitoring of the Greek coastline for total and fecal coliforms from April to October. For 1995, areas that were not in compliance with quality requirements of the European Union comprised 0.7% of 1 500 points along the Greek coast.

The most important and best-studied coastal areas are those of the Saronikos Gulf and the Gulf of Elefsis (near Athens) and the Thermaikos Gulf (near Thessaloniki); both areas are semi-enclosed systems that are influenced by pollution activities and have relatively weak currents. Tidal currents are weak in the Mediterranean and along the Greek coast amount to 30–50 cm at most.

The Saronikos Gulf is considered to be among the most polluted Greek gulfs, and the Gulf of Elefsis is the most eutrophic area in the whole Saronikos region because nutrients are also released from sediments in anoxic periods. About 40% of Greek industries are located on the coast of Attiki, along the northern part of the Saronikos Gulf, and large amounts of industrial effluents (about 100 000 m³/day) are discharged into the sea in this area. Some of the principal industries (oil refineries, shipyards, chemical plants, food processing plants, metals shops, cement industries, etc.) are located within Elefsis Bay. It is estimated that about 20 000 t of petroleum are discharged annually into the Saronikos Gulf.

During the period 1986–1991, about 130 pollution events from ships and about 25 from refineries and industries have been recorded in the Saronikos Gulf.

For many years, untreated sewage from Athens (about 600 000 m³/day) was discharged into the shallow Keratsini Bay through the Central Sewage Outfall. Since September 1994, primary treatment of wastes from Athens has been carried out at the Sewage Treatment Plant at Psytallia Island. The total amount of organic load removed is around 40%. Disposal of effluents through two pipes placed 30 m below the surface at the bottom of the Saronikos Gulf has led to significant differentiation in the distributions of dissolved oxygen and nutrients in the Saronikos Gulf.

Pollution in the Saronikos Gulf influences the abundance, composition, and structure of plankton. Furthermore, pollution tends to reduce the number of species. The benthic fauna of the Gulf are also disturbed mainly in the Gulf of Elefsis, in Keratsini, and near Psytallia where there are extended azoic zones. There is also a disturbance in the population of *Posidonia oceanica*, as it is well known that *Posidonia* is heavily affected by pollution of the Gulf and also by various construction activities in the coastal zone.

The Thermaikos Gulf is a semi-enclosed area into which four major rivers (Aliakmon, Loudias, Axios, and Gallikos) flow, enriching it with organic carbon,

nutrients, and particulate matter. Nutrient concentrations at the mouths of the rivers are high, and the Thermaikos Gulf has nutrient values 2–6 times higher than an oligotrophic area. As a consequence, red tides and phytoplankton blooms have been observed at times in the Thermaikos Gulf, and anoxic conditions develop during the summer period near the harbor of Thessaloniki. Thermaikos Gulf is actually heavily polluted by sewage from Thessaloniki and by industrial effluents from about 250 factories. The sewage waters are estimated at 150 000 m³/d, of which only 30% are treated. A new treatment plant is under construction to handle the entire quantity of sewage.

Environmental Policy, Monitoring, and Protective Measures

In Greece there are 24 protected areas (occupying 223 000 ha) of the following types:

- 8 national parks (60 000 ha),
- 2 natural monuments (18 000 ha),
- 6 nature reserves (11 000 ha), and
- 8 protected landscapes (133 000 ha).

However, the actual protection of natural reserves and habitats of all kinds and the enforcement of existing legislation is very poor owing to:

- practical difficulties (large remote areas),
- insufficient funds and lack of trained personnel,
- complicated and competing responsibilities and structures of public services, and
- lack of voluntary environmental organizations.

Greece's remaining wetlands have been estimated to range up to 190 000 ha, representing a loss of nearly 300 000 ha during this century. Approximately 100 000 ha are included in 11 designated Ramsar sites, where fifteen areas apart from the Ramsar wetlands (based on the convention on wetlands signed in Ramsar, Iran in 1971) have been classified as special protected areas.

There is only one marine park in Greece. The Marine Park of North Sporades was established to protect the monk seal, *Monachus monachus*. It was declared a national park by presidential decree in May 1992. The park is divided into two main protection zones (A and B). Zone A (1 587 km²) is a strict protection zone and in some of its areas, chosen on the basis of urgency for protection, uniqueness, and wilderness of plant and animal life, special protection measures are in force. In Zone B (678 km²), which includes inhabited areas, protection measures are less stringent. Alonnisos is the largest island in the park, which also encompasses 6 smaller inhabited islands and 22 uninhabited islands and rocky outcrops.

Environmental degradation in the area would be a lot more serious and, in many respects, irreversible if

the countries around the Mediterranean had not committed themselves in 1975 to work together to combat the different forms of pollution and to control development. The Mediterranean Action Plan (MAP) is one of the largest international programs in the environmental field; it involves the interaction of 18 countries and the European Union, practically all the major organizations of the United Nations, four Regional Activity Centers, a growing list of nongovernmental organizations, and a vast number of scientists. Over 100 laboratories participating in the Mediterranean Pollution Research and Monitoring Program (MEDPOL) have tracked down, identified, and attempted to understand better, both the sources of pollution and the processes that take place in the sea, the soil, and the air. Athens was selected by the contracting parties in 1981 as the location of the coordinating unit that moved there on 1 July 1982.

Establishment of monitoring systems for measurement of temporal and spatial variations and distributions of principal pollutants is another important result of the MAP/MEDPOL program. The Greek MEDPOL National Monitoring Program includes 211 stations in the Aegean area, mainly at coastal sites, distributed in the six regions of the Saronikos Gulf, Thermaikos Gulf, Gulf of Kavala, Northern Crete, Islands of Lesbos, and Rhodos islands. These stations monitor the following sources of pollution: general coastal areas (20), hot spot end estuarine areas (70), bathing areas (120), and air-borne sources (1).

The Ministry of Environment has recently established a similar monitoring network for surface waters, under the coordination of the General State Chemical Laboratory. The network includes 133 sampling stations in rivers and 58 in lakes. There are also automatic online systems for monitoring the quality of riverine waters entering Greece from the north, in order to avoid ecological damage from effluents originating in those neighboring countries.

The main parameters monitored are heavy metals (in seawater, effluent, biota, sediment, suspended matter, and precipitation), halogenated hydrocarbons (in biota, effluent, and sediment), petroleum hydrocarbons (in biota, seawater, and sediment), polyaromatic hydrocarbons (in biota, sediment, effluent, and seawater), total coliforms, fecal coliforms, fecal streptococci, nutrients (in seawater and effluent), chlorophyll (in plankton), total organic carbon and calcium carbonate (in sediment), dissolved ions (in effluent), pesticides and polychlorinated biphenyls (in seawater, effluent, sediment, and biota), as well as standard parameters in seawater. Meteorological parameters and ozone concentrations are also measured in air. Frequency of sampling varies, depending on the pollution parameter group and matrices.

Air pollution monitoring was initiated in Athens about 25 years ago with the measurement of SO_2 . About 10 years ago, an automatic system was installed, which consisted of six stations that measure SO_2 , CO, NO_x , and O_3 continuously. A lot of data have been gathered about the mechanisms causing the atmospheric pollution and its temporal evolution. The principal measures that have been chosen to reduce the effect of atmospheric pollution (thus far, only partially successful) are the following:

- reduction of sulfur content in oil used for domestic heating (3.5%–0.3%),
- prohibition of diesel cars inside Athens,
- reduction of lead content in gasoline (0.84 g/l–0.15 g/l) for noncatalytic cars,
- prohibition of use of half of all private cars in the city center every day and of any cars whose pollutant emissions exceed permitted levels,
- construction of peripheral arteries and some high-level and underground crossings,
- construction of additional subway lines, and
- control of emissions of cars, buses, and industrial sources.

The vital role of chemists is obvious in setting up and maintaining these monitoring systems, in assessing the quality assurance of the analytical results, and in properly evaluating the information in order to improve our knowledge of environmental chemistry and pollution mechanisms and to succeed in improving overall environmental quality according to the principles of sustainable development.

Data for this article came from the following sources:

1. Environmental Statistics (1996). Office des publications officielles des Communautés européennes, Luxembourg, 1997.
2. Europe in numbers (1995). Office des publications officielles des Communautés européennes, Luxembourg, 4th edition, 1995.
3. National Statistics Service of Greece (1996). Environmental Statistics, Year 1994 with Comparative 1993 data, Athens, 1996, pp. 45–50.
4. UNEP (1996). State of the Marine and Coastal Environment in the Mediterranean Region, MAP Technical Reports Series, No. 100, UNEP, Athens, 1996.
5. UNEP(OCA)/MED WG.111/Inf.9 (1996). Survey of pollutants from land-based sources in the Mediterranean. UNEP, Athens, 1996.
6. Dassenakis, M. (1996). Estuarine systems: General characteristics and environmental problems. Presented at scientific conference on “Greek Coasts and Seas at 2000”, University of Peraeus, February 1996, Proceedings, pp. 143–164.
7. Psilovikos A. (1992). Prospects for wetlands and waterfowl in Greece. *Manag. Medit. Wetl. and Their*

- Birds, IWRB Spec. Publ. No. 20, pp. 53–55.
8. Sakellariadou, F., Tselentis, V.S., and Tzannatos, E. (1994). Dissolved/dispersed petroleum hydrocarbon content in Greek coastal areas. Presented at international symposium on "Pollution of the Mediterranean Sea", WTSAC, Nicosia, Cyprus, pp. 151–155.

9. Scoullos, M., Dassenakis, M., Zeri, C., Papageorgiou, K., and Rapti M. (1987). Chemical studies of main estuaries and coastal areas of Greece. Progress Report to DG XI, Project GEC-ENV-560 GR.

News from IUPAC

Japanese Version of IUPAC, IUPHAR, and IUTOX Report on Natural and Anthropogenic Environmental Oestrogens: The Scientific Basis for Risk Assessment

IUPAC's Division of Chemistry and the Environment (VI) has prepared a Japanese translation of the Special Issue of *Pure and Applied Chemistry* (Vol. 70, No. 9, 1998) that addressed the scientific underpinning for the controversial international concerns about endocrine disrupters. The translation effort was coordinated by Dr. Junshi Miyamoto, President of IUPAC Division VI. The Special Issue, resulting from the cooperation of three preeminent international scientific organizations, covers a wide range of scientific aspects and subjects relevant to the issue and provides the background information necessary for informed debate.

The 19-chapter report, *Natural and Anthropogenic Environmental Oestrogens: The Scientific Basis for Risk Assessment*, was prepared by IUPAC in collaboration with the International Unions of Pharmacology (IUPHAR) and of Toxicology (IUTOX), and with the support of the International Council for Science (ICSU). The subject, commonly known as *endocrine* or *hormone disrupters*, is a complex, emotional, and controversial issue for which many scientific questions remain. Several aspects related to human and environmental health are presented, and the conclusions and recommendations drafted by the presidents of the three Unions review the policy issues and how they relate to the science.

This publication is the result of continuous efforts to address issues of societal and industrial concern objectively, involving the chemical sciences. A similar report on oil spill countermeasures technologies and response methods was published in January 1999.

For further information, visit <http://www.iupac.org/publications/pac/special/0998/>, or contact Dr. Junshi Miyamoto, Sumitomo Chemical Company, Ltd., 5-33 Kitahama 4-Chome, Chuo-ku, Osaka 541-8550, Japan; E-mail: yokonaga@ohprime.sumitomo-chem-co.jp; Tel.: +81 (6) 6220 3152; Fax: +81 (6) 6220 3550.

IUPAC Observer's Report on the Ninth Meeting of the IPCS Program Advisory Committee, Berlin, Germany, 5–8 October 1998

Dr. John H. Duffus (Edinburgh Centre for Toxicology, 43 Mansionhouse Road, Edinburgh EH9 2JD, Scotland, UK; E-mail: J.H.Duffus@btinternet.com), Chairman of the IUPAC Chemistry and Human Health Division's Commission on Toxicology (VII.C.2) has submitted the following report:

Introduction

The ninth meeting of the International Program on Chemical Safety (IPCS) Program Advisory Committee (PAC-9) was hosted in Berlin, Germany from 5–8 October 1998 by the German Ministry of Environment, Nature Conservation, and Nuclear Safety. Dr. M. Mercier, IPCS Director, noted that two of the three co-operating organizations had been going through a period of reformation and reconstruction. In particular, the World Health Organization (WHO), under its new Director General (Dr. Gro Harlem Brundtland) was developing a structure of "clusters", of which a new cluster on Sustainable Development and Healthy Environment would include the Program on Chemical Safety (PCS).

Dr. P. Toft, IPCS Associate Director, described activities undertaken by IPCS during this period. Presentations were also made by Mr. J. Willis, representing United Nations Environment Program (UNEP) Chemicals, and Dr. J. Takala, representing the International Labor Organization (ILO), to outline activities undertaken by each of their organizations.

Dr. Toft noted that close cooperation had continued with the Food and Agriculture Organization (FAO) in relation to the operations of the Joint Expert Committee on Food Additives (JECFA) and Joint Meeting on Pesticide Residues (JMPR), as well as with the Organization for Economic Cooperation and Development (OECD) on a number of risk assessment and risk management programs. Also noted was the strengthening of relationships with several nongovernmental organi-

zations, including IUPAC. Some concern was expressed that current WHO restructuring may indicate a subtle shift away from a focus on human health protection toward social health and sustainable development priorities. However, Mrs. Singh, the new Executive Director for Sustainable Development and Healthy Environments, had indicated her commitment to maintaining IPCS as the prime carrier of responsibilities for addressing human health issues arising from chemical use.

In his presentation, Mr. Willis noted that UNEP Chemicals completed negotiation of a legally binding instrument for the Prior Informed Consent (PIC) procedure and initiated negotiations for a legally binding instrument to control Persistent Organic Pollutants (POPs). The continuing strategy of UNEP Chemicals includes strengthening of national capacities for chemicals management, development of cleaner methods of production, and strengthening of partnerships with other stakeholders, including IPCS.

Dr. Takala referred to the strong interaction between ILO and WHO on occupational hygiene and chemical safety issues, with particular emphasis on a globalized approach to resolving issues of social justice and safe working conditions. He outlined some of the methods by which ILO disseminates information on chemical hazards in the workplace, including the availability and utility of CD-ROMs and internet-accessible databases. He noted that completion of the project on harmonization of chemicals classification and labeling (it is hoped by the year 2000) would have a significant impact on ILO programs.

Declarations of Interest

There has been some criticism of IPCS for using experts from industry on working groups assessing certain substances. In order to ensure transparency and to eliminate any suggestion that IPCS assessments may be biased, a form has been developed for participants in IPCS activities to declare potential conflicts of interest. The PAC endorsed the Declaration of Interest form. It is important to ensure the greatest possible expertise on IPCS Expert Groups while safeguarding the objectivity of the process. As this effort may sometimes lead to perceived conflicts of interest, the principle of transparency is particularly important. It was accepted that the form should be used to disqualify experts only when they are being paid to advocate a particular position, or where their potential conflicts of interest are so severe as to call their objectivity into question.

In order to give this matter further consideration, the PAC recommended that a small working group be commissioned to liaise with the IPCS director, representatives of the three cooperating organizations, and their legal advisors where necessary, to report back to

the PAC Standing Committee within six months on issues relating to transparency and disclosure of conflict of interest. The PAC members recommended to constitute this subcommittee are Dr. W. Farland, Dr. R. Fielder, Mr. M. Wright, and, as an independent contributor, Dr. J. H. Duffus. The objective of these activities should be to attain a culture of transparency and objectivity both within IPCS and with outside clients, collaborators, and the interested public.

Interorganization Program for the Sound Management of Chemicals (IOMC)

The IOMC was established in 1995 to serve as a mechanism for coordinating efforts of intergovernmental organizations in the field of chemical safety. The IOMC is designed to be a cooperative undertaking among intergovernmental organizations that, within the framework of their own respective constitutional mandates, work together as partners to promote international work. Scientific and technical work under the framework of the IOMC is carried out through the existing structures of the participating organizations, either individually or jointly. The original six participating organizations are UNEP, ILO, FAO, WHO, United Nations International Development Organization (UNIDO), and OECD. The United Nations Institute for Training and Research (UNITAR) formally joined the IOMC as a participating organization in January 1998.

Specific technical level coordinating groups have been established in relation to the following program or subprogram areas: harmonization of classification and labeling of chemicals, chemical information exchange, chemical accident prevention, preparedness and response, and pollutant release and transfer registers. These groups provide a regular means for all interested bodies working in the respective areas to consult with each other on program plans and activities, and to discuss ways and means of ensuring that the activities are mutually supportive. With agreement of the IOMC participating organizations, international organizations, regional organizations, governments, and interested industry, labor, and public interest groups that have significant activities in the respective areas can be invited to participate in the coordinating groups. The Terms of Reference and Secretariat contact for each of the IOMC coordinating groups is available on the IOMC web site (<http://www.who.int/iomc/cg.html>).

IOMC publishes biannually a calendar of events to inform governments, intergovernmental organizations, and nongovernmental organizations about forthcoming events of the participating organizations in the area of chemical safety related to the programs and work of Chapter 19, Agenda 21. The IOMC calendar is available on the IOMC web site, from the IOMC Secretariat, or from any of the participating organizations. Further-

more, to facilitate provision of information and use of developed materials, an annotated list of available training materials will be posted on the IOMC web site and linked to the Inventory of Information Sources on Chemicals on UNEP's web site.

Reduction of Risk from Exposure to Chemicals

The following various activities were proposed.

Public Awareness Activities

With the goal of promoting the safe use of chemicals through public information and education campaigns, existing materials prepared by IPCS and collected from countries (e.g., publications, audiovisual material, brochures, posters, and examples of poisons prevention campaigns) are being assembled into a package, which may be adapted to the needs of individual countries and used for primary prevention activities.

Characterization of Populations

In order to promote better understanding of the impact of chemicals on vulnerable groups, such as children, women, malnourished people, and specific groups of workers, and to encourage prevention, it was recommended that IPCS consult widely with other organizations who may have collected data on vulnerable populations in order to enable risk assessments for such vulnerable groups to be made using relevant data.

Training Courses and Materials

Training activities for poisoning prevention and treatment include the following:

- *Operating Analytical Facilities:* An introductory (half-day) course by Dr. R. Braithwaite (Birmingham, England, UK) with members of the INTOX Analytical Group. An advanced level (one- to two-week) course, with practical laboratory training, is at the planning stage.
- *Provision of Evaluated Information:* Work plans for preparation of further evaluated documents for poisons control, up to the end of 1999, include 100 Poisons Information Monographs (PIMs), of which 30 will contain analytical sections where laboratory techniques are important for patient diagnosis and management; 23 Treatment Guides; and Antidote Volumes (chelating agents; organophosphorus poisoning; amatoxin, gyrometrine, and isoniazid poisoning; decontamination procedures; and enhancement of elimination). During the biennium 2000–2001, a further 150 PIMs and 3 Antidote Volumes are scheduled for preparation. These publications will be issued on INTOX and INCHEM CD-ROMs biennially, as well as on the INCHEM web site, and summaries of the Antidote Volumes will appear in *Clinical Toxicology*.

- *Information Management Tools and Networking:* Systems development during the period up to the end of 1999 is expected to include the following:

- An enhanced Version 4 of the INTOX CD-ROM, tested for single and multiple PC terminal use, and issued in English, French, Portuguese, and Spanish (for use at poisons centers).
- A database management system for a chemicals products register (for use in ministries and other institutions).
- Specific software applications based on the INTOX system, including a system for the Pesticide Epidemiology Project (see IPCS/PAC/98.15).
- Enhancement of the INTOX CD-ROM, with facilities for downloading substance characteristics and product information into the INTOX Version 4 system.

Other Activities

Other proposed activities include the following:

- Assembling guidance on emergency intervention levels for chemicals in a major incident.
- Expanding the number of Chemical Emergency Response Cards for first responders. A list of priority chemicals is being drawn up, based on a survey of the most commonly involved chemicals in incidents to which emergency services respond.
- Completion and testing of a modular, multilevel training course on chemical incident response for different authorities and issuing material in English, French, and Spanish (depends on availability of funding).
- Completion and testing of the database management software systems for the full range of proposed registries and issuing it in English, French, and Spanish, including the provision of user's manuals and training packages.
- Developing a database that consolidates evaluated information for chemicals emergency response in order to provide a compendium of official reviews of major incidents and results of the international data exchange on incidents; to be issued biannually on CD-ROM and updated regularly on the Web as a contribution to the Global Information Network on Chemicals (GINC) (depends on availability of funding).
- Consolidating an international data exchange mechanism for major chemical incidents with analysis and dissemination of the data (e.g., on CD-ROM and the Web, as proposed above), with consideration of the need for regional mechanisms through regional WHO Collaborating Centers.

Risk Assessment Issues

- The first 12 Concise International Chemical Assessment Documents (CICADs) have been completed and a guidance manual compiled for authors involved in the preparation of these documents. IPCS has collaborated with OECD in the preparation of the documents, and this collaboration will continue to include IPCS involvement in OECD assessments of existing chemicals, concentrating on high production volume chemicals.
- Continuing efforts are being made to ascertain the effective use of Environmental Health Criteria documents to ensure that they are meeting their objectives.
- Risk assessment and safety evaluation of pesticides continues, with increased efforts to obtain and ensure international collaboration in these matters. While appreciating that current IPCS links with FAO on issues of pesticide risk assessment could facilitate the collection of data on pesticide exposures and health impacts, the PAC considered that the problem requires partnership with a broader range of stakeholders, including industry and various national, regional, intergovernmental, and nongovernmental organizations. The PAC recommended that the IOMC may be well placed to assist with coordinating this liaison. Partnership with industry was considered to be vital, because there is a need for ready access to information on pesticide product formulations. The PAC noted and encouraged the further development of efforts to harmonize pesticide risk assessment processes, particularly those intended to make more use of existing national assessment documents.
- The work on risk assessment of endocrine disrupters will produce an online repository of global research on the health and ecological effects of these substances. In addition, a scientific peer-reviewed global assessment document will be published to summarize what is known and what remains unknown about the effects of endocrine disrupters.

Research Methodology

Development of risk assessment methodology will continue, and research in this area will be encouraged, particularly with reference to the derivation of better exposure guidance values. It was recommended that the intended outcomes of the research methodology projects specifically address connectivity with other IPCS risk assessment programs so that they may be applied strategically to achieve overall program objectives. Such projects could also have an important catalytic role in promoting collaborative research activities, seminars, and workshops, with the opportunity to achieve useful outcomes in risk assessment methodology with only a modest investment of scarce IPCS resources. It was further recommended that IPCS continue to play a role in developing methodological documents on the principles of risk assessment.

Conclusion

As an observer at this meeting, I was impressed by the wide range of activities sustained by IPCS on rather meager funds. It is a pity that the work of IPCS is not better known in the chemical community. This relative obscurity exists largely because IPCS has not been as well publicized as it should be by WHO or by national governments via their public information services. For some reason, the publications side of WHO is much less successful in marketing its products than are commercial publishers. Part of the solution, identified by PAC, is to draw the attention of WHO to the need to make the IPCS component of its web site more visible and accessible to those seeking information on chemical safety programs. PAC also recommended that its members actively seek to promote the use of IPCS information resources, such as INCHEM, INTOX, etc., within their own regions. For myself, I strongly recommend that every institution involved in chemistry and concerned about the safety of chemicals make full use of IPCS publications as the most reliable source of evaluated information available in this area.

With great sadness, we report that Prof. Dr. Antonin A. Vlček passed away on Sunday, 10 October 1999. Throughout his career, he was very active in IUPAC. He was a member of the IUPAC Bureau from 1979 to 1987, and he also served as National Representative on the Commission on Electroanalytical Chemistry (V.5) from 1984 to 1991.

News and Notices from Other Societies and Unions

The Morbidity and Mortality of Scientific Illiteracy

This article, by Prof. Donald Weaver, is reprinted with permission from *Canadian Chemical News*, Vol. 51, No. 7, pp. 5–6 (July/August 1999). Prof. Weaver is a Fellow of the Canadian Institute of Chemists (FCIC) and a professor in both the departments of chemistry and medicine at Queen's University in Kingston, Ontario, Canada. He was the winner of the Merck Frosst Centre for Therapeutic Research Lecture Award in 1997 and is currently the director representing the Biological/Medicinal Division on The Canadian Society for Chemistry (CSC) Board of Directors.

Chemistry is the central science, drawing on the basic principles of physics while enabling biological phenomena to be understood at a molecular level. From this unique position, chemistry pervades virtually every aspect of modern life, influencing the quality of the water that sustains our lives, the pharmaceuticals that save our lives, and the advanced materials that enrich our lives. It would seem reasonable that a truly informed person in the modern world should have at least a rudimentary scientific literacy in the molecular sciences (as well as being able to read and write). Regrettably, this is not the case. Scientific illiteracy, scientific innumeracy, and the growth of pseudoscience ("junk science") are the reality. The ramifications of these failings could be disturbingly significant.

Nowhere are the implications of these failings more apparent than in the health care system. Modern society expects a pill for every ill, a molecule for every ailment—and it had better be a molecule with optimal efficacy and minimal toxicity. The obvious, but underappreciated, fact is that drugs and medical treatments are based on molecules. Not surprisingly, the development of medical therapeutics is dependent more on chemistry than on any other scientific discipline. Drugs exert their effects via a receptor, a macromolecule that is crucial to the pathogenesis of the disease under study. A first step in the rational drug design process is the resolution of the three-dimensional structure of this receptor by a structural chemist, such as an X-ray crystallographer. Next, the medicinal chemists and organic chemists design and synthesize drug molecules to bind with the receptor. Computational chemists and molecular modelers facilitate this drug design process. Analytical chemists aid in determining the drug's pharmacokinetic half-life and metabolic properties. Finally, process chemists and chemical engineers work out methods for scale-up and quality control. This

sequence of events is poorly appreciated in the general population for whom the realization that "physicians don't discover drugs, chemists do" is a startling revelation.

The failure to appreciate chemistry and the molecular sciences is apparent on an everyday basis in medical practice. In my own medical practice, the following five cases occurred during a recent two-month period.

The first was a patient who refused to receive intravenous antimigraine drugs because she was concerned that the sodium chloride and glucose in the intravenous solutions were synthetic in origin. She passionately believed that the molecules and even the constituent atoms themselves were fundamentally different between synthetic glucose and natural source glucose. For the safety of her own health, she "did not want to be exposed to synthetic atoms and molecules".

The second was a patient who abruptly stopped his antiseizure medications. He did so after purchasing two rather large horseshoe magnets which he now places on either side of his head when he sleeps at night. He informed me that the magnetic field promotes the electrons of his brain molecules into higher energy levels, thus permitting "truly natural healing to take place". In fact, he was disturbed that I was unaware of such basic scientific principles as applied to issues of human health care. Because he had suddenly stopped his anticonvulsant drugs, he experienced several severe seizures producing a painful recurrent shoulder dislocation.

The third was a patient who stopped taking her cholinesterase enzyme inhibitor for Alzheimer's disease. At her family's urging, she was taking large doses of Vitamin E and *Ginkgo biloba* at four times the recommended daily dose, because "everyone knows that natural products are safer". The family refused to believe that their mother's recent hemorrhages were due to this mixture of agents—"vitamins and natural products are inherently safe and quite harmless".

The fourth is a patient who suddenly stopped his anticonvulsant drugs and began to consume massive doses of vitamin B6 to cure his epilepsy. He had learned of this supposed cure from an Internet chat group. He soon developed severe numbness in his hands and feet from vitamin B6 toxicity, but refused to believe that a natural product could produce such side effects. Moreover, since he had precipitously stopped his anticonvulsant drugs, he experienced multiple seizures, resulting in the loss of his driver's license and ultimately his job.

The fifth is an epileptic patient who decided to forego her conventional therapy in order to have "the bone

plates in her skull manipulated". She had read that the skull is composed of bones that fuse as a young child. She had been told that incorrect fusion of these bones "impedes the harmonious flow of chemicals over the surface of her brain", thus causing seizures. She now visits an alternative medicine practitioner who literally beats up her head once a month, supposedly to realign this claimed aberrant bone fusion. She stopped taking her anticonvulsants and has recently experienced a recurrence of her seizures. Not surprisingly, she now also has headaches.

These five people are not educationally deprived—all have high school education, and two have post-secondary school education. They are simply average Canadians trying to do what they think is best for themselves.

The problem of scientific ignorance on the part of patients and their families is by no means restricted to patients with neurological problems. It is an issue that is becoming increasingly widespread. A recent high-profile court case reported from Hull, Québec further attests to this problem. A Québec naturotherapist has been convicted of criminal negligence causing death after telling the family of a diabetic girl to substitute baths and herbal remedies for her insulin shots. The 12-year-old girl died from complications of her diabetes on 28 March 1994. She died for want of insulin in Canada, the homeland of Banting and Best.

The situation is probably only going to get worse. Medical therapeutics are getting more complicated. With the new millennium will come improved receptor site-specific drugs, gene therapies, anti-apoptotic agents, and a variety of other increasingly sophisticated chemical attacks on human disease. Members of the general public are increasingly less equipped to deal with such issues. This situation calls into question that sacred concept called "informed consent". As every physician knows (and as every lawyer is quick to remind us), it is the obligation of the physician to ensure that patients understand their therapies. Where does one start? Is it truly possible to obtain informed consent from an individual who genuinely believes that having her head systematically punched once a month to reshape skull morphology will beneficially influence neurotransmitter flow in the superficial layers of the cerebral cortex? Furthermore, with medical schools deleting chemistry as a prerequisite (to pursue "more human-centered disciplines"), the physicians themselves won't understand the newly evolving molecular-based therapies. It will ultimately be a situation with the blind leading the blind.

Concomitant with this rise in scientific illiteracy has been the blossoming of so-called alternative therapies. Yes, the snake oil salesman is back! Most alternative therapies are well intentioned, some may work, and a number are probably fraudulent. Alternative therapies

come in a wide variety, including the good, the bad, and the downright ridiculous. First, there is the megavitamin approach. This regimen is based upon the notion that if a little of something is good for you, then a whole lot is probably really good for you. Apart from producing expensive and usually brightly colored urine, there are little, if any hard data to support the widespread use of large doses of vitamins. Next are the dietary approaches. There are the high-protein/low-carbohydrate, high-carbohydrate/low-protein, high-protein, and no-protein diets—all with the exact same therapeutic objective. These diets are sometimes coadministered with high colonic enemas and irrigations "to purge the body of its toxic chemicals". Once again, there is no scientific evidence to suggest that bowel toxins contribute significantly to the plethora of human suffering. Finally, there are the therapeutic touch practitioners. Therapeutic touch involves practitioners systematically waving their hands over the affected individual. This practice supposedly promotes therapeutic perturbations in the conventionally undetectable human energy fields surrounding the patient.

Of all the alternative therapies, the most rapidly growing is the use of herbal remedies. In 1997, North Americans spent an estimated \$12 billion for herbal and mineral products. Between 1993 and 1998, this market grew by 30–50 percent. Within this same time frame, the U.S. Food and Drug Administration received 2 621 reports of serious health effects—including 101 mortalities—linked to supplements. A small number of supplements dominate in the market. DHEA is a hormone reported to boost energy levels, augment muscle healing, and slow aging—it certainly received glowing recommendations from Mark McGwire. However, when it comes to toxicity DHEA doesn't hit the ball out of the park; it may increase the risk of breast and prostate cancer. Another agent with mixed effects is ephedra. Although ephedra (ma huang) has been purported to control weight while it reinvigorates, its use has been linked to high blood pressure, headaches, seizures, and even death. Like ephedra, yohimbe has also been put forth as an agent to reinvigorate and even to augment male sexuality; however, it possibly produces weakness, paralysis, or death. Echinacea is widely used in the prevention and treatment of viral upper respiratory tract infections. Although several trials have suggested that the herb might reduce cold symptoms, long-term use may paradoxically produce immune-system suppression. A 1997 U.S. study suggested that *Ginkgo biloba* may symptomatically improve mental performance in patients with mild to moderate dementia. Nevertheless, its use is sometimes complicated by bleeding problems, gastrointestinal disturbances, and headache. Finally, there is saw palmetto. Preliminary work suggests that saw palmetto shows promise for benign enlarged prostate disease; however, it too has its Achil-

les' heel, causing stomach upset, headache, and even erectile dysfunction.

The problem with alternative therapies like the herbals is not with their potential therapeutic benefits. Herbal remedies do contain an interesting mixture of flavone glycosides, terpene lactones, and various phenolic derivatives. Most chemists would agree that Mother Nature is a truly amazing synthetic chemist and that natural products such as herbals do represent an opportunity for impressive molecular diversity. In fact, the recent growth of combinatorial chemistry is an attempt to reproduce this diversity generation in the laboratory setting. Rather, the problem with alternative therapies is the failure of society to hold them accountable to the same rigorous scientific scrutiny used for conventional drugs. Just because they are natural, doesn't make them safer. After all, cobra venom comes from an all natural source. The worsening of scientific illiteracy and scientific innumeracy, combined with the flourishing growth of pseudoscience, is not helping to ameliorate this situation.

In general, society places less value on the pursuit of scientific rigor, and is increasingly less inclined to listen to its mainstream scientists. When it comes to chemistry and the physical sciences, people think of thalidomide, DDT, and plutonium bombs. They do not think of penicillin, AZT, and Dacron aortic patches. A truly appalling event occurred earlier this year in Washington, DC, when members of the Committee on Government Reform listened raptly to actress Jane Seymour extol the virtues of alternative medicine, such as homeopathic treatments for cancer and acne. Dr. Quinn, Medicine Woman, was invited to present at the inquiry because "actresses are role models who have tremendous effects on public attitudes", and thus their opinions on science should be studied ("I'm not a doctor, but I play one on TV"). On the other hand, when the Nobel laureate Gertrude Elion recently died, her life did not make the cover of *Time Magazine* or the national newscasts. Elion had been involved in the discovery of drugs such as azathioprine, trimethoprim, and acyclovir (to name only three of the many drugs to which she was a central contributor). However, this hat trick of discoveries is not enough to get her into the record books of the lay press. She did not strive for personal fortune or fame. She didn't set NHL, NBA, or box office records. She just used good rigorous science to save many lives and to help humankind.

In the next millennium, humankind will have to confront an array of assaults. There is the specter of prion diseases, killer viruses, drug-resistant bacteria, and environmental cancers—prospects made even more scary by the decline of scientific literacy and the rise of pseudoscience. It is not productive to stick our heads in the sand while arrogantly decrying reductionism and the tenets of Western science. These problems cannot

be avoided; they will have to be confronted using good rigorous science as a weapon of salvation—a weapon hopefully wielded by people who know how!

Report of First Annual Meeting of National Authority Representatives and First Meeting of Chemical Industry Representatives Organization for the Prohibition of Chemical Weapons (OPCW), The Hague, Netherlands, 26–27 June 1999

Benjamin C. Garrett [10704 Cogswell Place, Fairfax Station, VA 22039-1823 USA; E-mail: garrettb@battelle.org; Tel.: +1 703 978 1873 (home), +1 703 413 7837 (office); Fax: +1 703 413 8880] has submitted the following report:

Summary

The first annual meeting of National Authority¹ representatives and the first meeting of chemical industry representatives was held 26–27 June 1999 at the Organization for the Prohibition of Chemical Weapons (OPCW), The Hague, The Netherlands.² Hosted by the OPCW, the meeting was intended to provide an overview of OPCW activities, especially those performed in support of inspections. Most of the meeting consisted of scripted briefings by OPCW staff. Occasional opportunities were afforded for comments from participants. Attendance was overwhelmingly from the National Authorities and their delegations, with chemical industry representatives comprising about ten percent of the audience.

The presentations demonstrated that the work of the OPCW is well organized and brisk; that scientific input is on occasion both solicited and considered; and that additional work by the OPCW may be needed to maintain the confidence of scientists, who share in the burden of complying with the Chemical Weapons Convention (CWC).³ The meeting concluded without specific comments regarding the prospects of a second meeting of chemical industry representatives and without specific requests for input from nongovernmental organizations or individuals.

Background

The CWC entered into force in April 1997. At the time of the meeting, 125 nations had ratified and acceded to the CWC. The CWC mandates, among other things, that each States Party must:

- declare and destroy all chemical weapon stockpiles on its territory;
- undertake certain obligations regarding the destruc-

- tion of old and abandoned chemical weapons;⁴ and
- submit to an elaborate and potentially intrusive regime of data declarations and on-site inspections to maintain confidence that prohibited activities are not taking place.

This meeting marked the first annual gathering of representatives from the offices of the National Authorities of the States Parties as well as the first gathering of representatives from chemical industry. The International Union of Pure and Applied Chemistry (IUPAC) was invited to participate as a representative of chemical industry.

The meeting took place over a weekend. On the following Monday, 28 June, a week-long session of the Conference of States Parties began. Therefore, many National Authority representatives had already gathered in The Hague, and their turnout at this meeting was excellent—between 200 and 250.⁵ There were about 25–27 chemical industry representatives. The agenda, list of participants, and other materials handed out at the meeting are listed at the end of this report, and copies can be obtained from the author.

Selected Meeting Issues

The meeting was given over to various presentations, mostly by OPCW staff. Occasions were afforded for discussion, although these occasions were limited. The discussion periods were dominated by three issues:

1. conduct of inspections, with the discussion topic being experiences of industry as the inspected party;
2. concentration limit for mixtures containing one or more Schedule 2 or Schedule 3 chemicals⁶ as a component, with the discussion topic being the lack of harmonization among States Parties regarding a threshold for reporting relative to the concentration of Schedule 2 or 3 chemical in the mix; and
3. declarations and inspections for Discrete Organic Chemicals (DOCs),⁷ with the discussion topic being the approach the OPCW Inspectorate might take in conducting inspections of DOC facilities.

Issues of possible interest to the IUPAC membership that failed to be discussed during this meeting include the following:

- destruction of old and abandoned chemical weapons;
- destruction of chemical weapon stockpiles; and
- conversion of facilities formerly associated with chemical weapons.

The failure to discuss these (and other) issues more likely reflects the limited time available for discussion of any issues than it does a conscious effort by the OPCW to avoid confronting these issues.

Conduct of Inspections

Several presentations dealt with the conduct of inspections. Comments from chemical industry representatives suggested that:

- Industries, in general, have confidence that the OPCW has instituted procedures to safeguard confidential business information, including results from on-site inspections.
- Industries are monitoring the time required to comply with inspections and with other CWC requirements. Data collected to date suggest the time requirements are modest, but the chemical industries remain concerned that the time requirements may increase.
- Industries remain unconvinced that the OPCW has placed its monitoring and inspection requirements into the full context of all such monitoring and inspecting taking place at any one industrial site. Specifically, industries must address requests from national and regional authorities for monitoring and inspecting general site health and safety; labor practices; compliance with Good Laboratory Practices (GLPs), Good Manufacturing Practices (GMPs), and similar food- and drug-related requirements; and reporting of revenue (taxes), including treatment of tax-free and reduced-tax chemicals. Therefore, the prospect exists for several inspections occurring simultaneously, each demanding immediate access and full attention from industry personnel.

The meeting concluded without any position taken on the issue of the conduct of inspection, and this topic is certain to be discussed at any future meetings of National Authority and chemical industry representatives. But the general feeling was that the OPCW has earned the confidence of both States Parties and industry in the inspections conducted thus far.

Concentration Limit for Mixtures

For purposes of reporting exports and imports of Scheduled chemicals, the CWC sets no threshold for the amount (concentration) of a Schedule 2 or a Schedule 3 chemical present in mixtures. The OPCW might establish a threshold, but so far has failed to achieve a consensus on this issue. Therefore, States Parties are free to set their own threshold. This situation prevails, with some States Parties having no lower limit (that is, any amount of a Schedule 2 or 3 chemical present in a mixture requires that the mixture be declared for purposes of export and import). Other States Parties have set limits or thresholds; 20–30% thresholds seem common (that is, if a mix contains less than the threshold of a Schedule 2 or 3 chemical or of all Schedule 2 and 3 chemicals in aggregate, then that mix is exempt from declaration for export and import purposes).

The lack of harmonization among States Parties in dealing with Schedule 2 and 3 chemicals in mixtures was important to chemical industry representatives, as evidenced by papers submitted by industry groups and by the comments made during the meeting. The OPCW staff appeared attentive to industry comments, but were unprepared to deal with this issue in any substantive way. Therefore, there was no sense of closure on the issue, which is certain to be the subject of any future meeting.

Discrete Organic Chemicals

A States Party is obliged to make an initial declaration of DOC production facilities for plants "which produced by synthesis...[a DOC] containing the elements phosphorus, sulfur, or fluorine" (CWC, Verification Annex, Part IX, paragraph 1). Such a DOC is referred to as a PSF-chemical.

The chemical industry representatives were particularly interested in the issue of DOC facility inspections because inspections will start in May 2000, unless the Conference of States Parties, by consensus, agrees to postpone.⁸

As discussed during the meeting, DOC facility inspections pose a peculiar challenge both to the inspectors and to the inspected party. According to the OPCW Inspectorate staff, the objective of the inspection should be to demonstrate the absence of Schedule 1 chemicals. Therefore, the inspection exercise proves a negative; that is, the inspectors must show that no Schedule 1 chemicals are present (in this context, at a DOC facility producing a PSF-chemical).

To fulfill this objective, the inspector presupposes the negative: namely, "Schedule 1 chemicals are present". Then the inspector examines every aspect of the DOC facility to locate a Schedule 1 chemical and, if none is found, assumes they are all absent. No threshold has been established for Schedule 1 chemicals, and while inspection at the molecular level seems absurd, it has not been expressly ruled out. Therefore, the potential for an intrusive and time-consuming DOC facility inspection is great.

The OPCW Inspectorate's approach for DOC inspection differs, however, from the one of demonstrating the absence of Schedule 1 chemicals. The difference seems rooted in political realities and the consensus-building that typify all OPCW activities. The agreed-upon approach, as stated during this meeting, is that the inspectors will examine the facility and its records to determine whether the facility declaration is consistent with what is observed and what can be deduced via records. In reality, this inspection documents the validity and consistency of the DOC declaration, rather than demonstrating the absence of a Schedule 1 chemical. Therefore, a Schedule 1 chemical might be found on inspection if and only if its production causes some

perceptible alteration to what one might normally associate with DOC production.

In reality, the DOC production facility inspection regime will verify the validity of a DOC declaration, rather than demonstrate the absence of a Schedule 1 chemical. This approach appears manageable (unlike the approach of demonstrating the absence of a chemical). It remains unproved whether this approach will also ensure the arms control objective of prohibiting chemical weapon production.

Because DOC facility inspections begin in 2000, this issue is certain to merit attention at any followup meeting of chemical industry representatives.

Conclusions and Recommendations

The discussions during the first annual meeting of National Authority representatives and the first meeting of chemical industry representatives were enlightening but inconclusive. Several issues surfaced where the input of scientists—especially those working in chemical industry—might benefit the work of the OPCW as well as the effectiveness of the CWC. Based on this meeting, there appears to be no consensus regarding a threshold for Schedule 2 and 3 chemicals in mixtures. Similarly, the approach to inspecting DOC facilities is evolving. In both instances, IUPAC might consider providing a "Friend of the Chair" technical paper outlining the scientific and technical considerations that bear on the risk to the purposes of the CWC.

Meeting Materials⁹

OPCW Informational Papers

"Guidelines for determining declarable industrial facilities", Organization for the Prohibition of Chemical Weapons, November, 1998, 23 pp.

"The regulation of the international transfer of chemicals by the Chemical Weapons Convention", Organization for the Prohibition of Chemical Weapons, November, 1998, 4 pp.

OPCW (1998). *Images*, The Hague, The Netherlands, 36 pp. [Note: *Images* is a glossy brochure describing the OPCW.]

OPCW Presentations

Forgacs, Laszlo (Head, Operations and planning branch, Inspectorate, OPCW) "Confidential business information (CBI) issues and resolution during CWC inspections".

Gee, John (Deputy Director-General, OPCW). "Opening remarks".

Guerra, Gaston (Head, Declarations branch, Verification division, OPCW). "Making declarations work, part I (Imports and exports)".

"International cooperation programmes" (undated), 3 pp.

Kane, Anand, and Gilliquet, Jean-Nicolas (Policy of-
ficers and Inspectors, Inspectorate, OPCW). "Issues
resulting from industry inspections".

Makhubalo, John (Director, International cooperation
and assistance, OPCW). "Closing Remarks".

N'Guessan, Eugene (Inspector, Inspectorate, OPCW).
"In-house preparation for inspection team mem-
bers".

Shimamoto, Shu (Daicel Chemical Industries, Ltd., and
Japan Chemical Industry Association, Japan). "Low
concentration limit and inspection frequency of
Schedule 2 plant site".

Skripin, Yuri (Inspector, Inspectorate, OPCW). "Con-
duct of inspection on Schedule 2 facilities, Sched-
ule 3 facilities, and other chemical production fa-
cilities".

Wadhwa, Anil (Head, Government relations and politi-
cal affairs branch, External relations division,
OPCW). "Issues of interest to National Authorities
and chemical industry".

Yu, Zhiyong (Mission planning coordinator, Operations
and planning branch, Inspectorate, OPCW). "Keep-
ing ready for inspections. Operational aspects on
receiving and escorting inspections".

Presentations by Others

[Australia] Safeguards and nonproliferation office,
Government of Australia. "Making declarations
work: Export and import".

[CEFIC] European Chemical Industry Council/Conseil
Europeen de L'Industries Chimique (CEFIC). "Dis-
cussion paper." [Topic: Feedback from industry on
the implementation of the CWC.]

[CEFIC] European Chemical Industry Council/Conseil
Europeen de L'Industries Chimique (CEFIC). "Dis-
cussion paper on low concentration issue."

[Czech Republic] Government of the Czech Republic.
"Status of the implementation of the Chemical Weap-
ons Convention in the Czech Republic".

[Japan] Igarashi, Takuya (Chemical weapons control
policy office, Ministry of International Trade and
Industry, Government of Japan). "Lesson [*sic*] from
investigation into discrepancies in import and ex-
port data of Schedule 2 and 3 chemicals".

[Pakistan] Government of Pakistan. "Making declara-
tions work. Pakistan's experience."

[Sweden] Government of Sweden. "Manual for inspec-
tions of Schedule 3-plant sites", 24 June 1999, 24
pp.

[Switzerland] de Sá, Liliana (Federal office of foreign
economic affairs, Government of Switzerland).
"Dealing with industry declarations".

Meeting Administrative Materials

Program for the First Annual Meeting of National Au-
thorities and Chemical Industry Representatives, The

Hague, 26–27 June 1999.
List of Participants, First Annual Meeting of the Na-
tional Authorities and Chemical Industry, The
Hague, 26–27 June 1999.

Notes

1. The term "National Authority" has a precise meaning within the context of the OPCW. A National Authority is that person, persons, or office designated by a States Party to deal with the OPCW on issues regarding compliance.
2. This meeting was given various names by the staff of the OPCW, creating some confusion. The name listed here is taken from the original invitation distributed by the OPCW. While the OPCW staff intend to have the gathering of National Authority representatives be an annual affair, there was no such intention stated regarding the meeting of chemical industry representatives.
3. The proper name for this arms control treaty is "Convention on the prohibition of the development, production, stockpiling, and use of chemical weapons and on their destruction". *Chemical Weapons Convention* and *Chemical Weapons Treaty* are commonly used, as is the abbreviation *CWC*. That abbreviation is used in this report. All references to the CWC are taken from the English version.
4. "Old chemical weapons" is a category separate from "abandoned chemical weapons". Often, though, for purposes of discussion, the two are lumped together as "old and abandoned chemical weapons". That practice is followed here.
5. Many National Authority representatives are members of the Permanent Delegations of their respective States Party. Such members have permanent passes to the OPCW and were not required to register for the meeting. Therefore, the list of participants fails to capture the presence of such persons, causing a significant undercounting of overall attendance. The attendance figure given here was derived by counting attendees (minus OPCW staff).
6. The CWC provides three schedules of chemicals. In brief, a Schedule 1 chemical is one that has both been a chemical weapon and poses a high risk to the purpose of the CWC. An example is sulfur mustard [*bis*(2-chloroethyl)sulfide]. A Schedule 2 chemical is one that may be a precursor to a Schedule 1 chemical, poses significant risk to the purposes of the CWC, and is not produced in large commercial quantities. An example is thiodiglycol [*bis*(2-hydroxyethyl)sulfide], used in producing sulfur mustard. A Schedule 3 chemical is one that has been a chemical weapon, poses a risk, and may be produced in large commercial quantities. An example is chlorine.
7. The CWC defines a DOC to be "any chemical belonging to the class of chemical compounds consisting of all compounds of carbon except for its oxides, sulfides, and metal carbonates, identifiable by chemical name, by structural formula, if known, and by [CAS] registry number, if assigned" (Verification Annex, Part I, paragraph 4).
8. The Conference of States Parties met 28 June through 2 July and did *not* reach a consensus on postponing DOC facility inspections. Therefore, these inspections should start in 2000, barring some unforeseen development.
9. A copy can be provided on request to the author.

Reports from IUPAC-Sponsored Symposia

3rd International Symposium on Molecular Mobility and Order in Polymer Systems, 7–10 June 1999, St. Petersburg, Russia

This symposium continued the series of St. Petersburg meetings sponsored by IUPAC and organized by the Institute of Macromolecular Compounds of the Russian Academy of Sciences (RAS) and the Department of General and Technical Chemistry of the RAS. This meeting was also supported by the Russian Foundation for Basic Research and the St. Petersburg Research Center of the RAS. The symposium took place in the House of Scientists (the former Duke Vladimir's palace) located on the Neva River embankment in the picturesque center of the city close to the well-known Hermitage museum.

This symposium (as well as the first one in 1994) was oriented more toward dynamic and relaxation phenomena, whereas discussions at the second symposium (May 1996) were focused mainly on problems of structure and order. Of course, these shifts in the main thrust of the symposium were never too dramatic because mobility in polymer physics and in physical chemistry, just as in real life, is inseparable from the order (or disorder!) of the systems.

Principal topics of the symposium included the following:

- conformation and mobility of macromolecules in solutions, melts, and networks in strong external fields
- structure and properties of liquid-crystalline polymers
- block copolymers
- polymer layers, brushes, and micelles
- polymer complexes and membranes
- structure and dynamics of branched polymer systems, stars, dendrimers, and networks

All systems considered share a common general feature in that the order presented in them is "soft", and a pronounced molecular mobility exists in them.

The symposium featured 18 invited plenary lectures, 32 contributed lectures, and 180 poster presentations. This meeting was a truly international one, with lectures and posters presented by scientists from Canada, the Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Israel, Japan, Kazakhstan, Lithuania, the Netherlands, Portugal, Russia, Spain, Sweden, Turkey, the United States, Uzbekistan, the Ukraine, and the United Kingdom. Plenary and contributed lectures were presented by eminent, classical leaders in poly-

mer science (such as Profs. S. F. Edwards, T. M. Birshtein, G. J. Fleer, K. L. Ngai, Yu. Ya. Gotlib, etc.) and also by well-known, active younger researchers. The dynamic poster session was accompanied by very lively discussions.

A short account of the materials presented at the symposium was published in the book of abstracts made available to participants. Some invited plenary and contributed lectures are published as Volume 146 of *Macromolecular Symposia* (1999) by Wiley-VCH in Weinheim, Germany. Although not all the speakers will be able to present their lectures in this volume (some of the material had been published earlier or submitted elsewhere), it will provide a good representation of the scope of the meeting and the problems discussed.

Because of the close interconnection between different topics, materials presented at the symposium could be divided largely into two main areas: "mobility–structure–order" and "structure–order–properties". Lectures devoted to polymer dynamics (mobility–structure–order) described various types of relaxation phenomena on different time and length scales (from nanoscale to macroscopic scale), which were investigated by a broad variety of experimental methods, including polarized luminescence, differential scanning calorimetry (DSC), dielectric relaxation and vibrational spectroscopy, nuclear magnetic resonance (NMR), and quasi-electric neutron and X-ray scattering, among others. Theoretical work and computer simulations emphasized a detailed study of the collective motions in complex multichain systems and the effects of strong external or internal fields (as in crystalline phases). Theoretical approaches to unsolved problems of dynamics in melts, networks, and semi-ordered glassy systems were considered, taking into account the hierarchy of molecular motions and interactions.

Lectures on structure–order–properties were devoted to study of the interconnection between chemical constitution, morphology, and order for a broad class of macromolecular systems (see principal topics listed above), including biological polyelectrolyte systems (liposomal membranes), hydrogels, block copolymers, monolayers, mesophases, etc. The many experimental methods employed included electron and X-ray spectroscopy, nonlinear optic phenomena fluorescent probes, and various experimental methods for the investigation of polyelectrolytes. Principal interest in the structure–order–properties area is centered around systems with complex chemical constitution and morphology, such as polyelectrolytes, copolymers, mesophases, and glassy states with local ordering.

This symposium was well organized. The weather

was beautiful, and participants were able to enjoy sightseeing in St. Petersburg and its near suburbs. The organizers of the symposium are very grateful to IUPAC for its sponsorship and help in publishing the lectures presented.

The organizing committee believes that this symposium has made a significant contribution to understanding the interconnection of mobility and order in complex and heterogeneous polymer systems, including polyelectrolytes and biopolymers. Continuation of this series of symposia should be very effective and fruitful for the subsequent development of polymer science and the fostering of cooperation among theorists, experimentalists, and scientists from different countries, schools, and communities of science.

Professor V. A. Kabanov
Department of Polymer Science
Moscow State University, Moscow, Russia

**International Memorial K. I. Zamaraev
Conference on Physical Methods for
Catalytic Research at the Molecular
Level, 28 June–2 July 1999,
Novosibirsk, Russia**

This conference was held at the Novosibirsk Scientific Center under the auspices of the Boreskov Institute of Catalysis on the 60th anniversary of the birth of Professor Kirill I. Zamaraev, who took an active part in the work of IUPAC for many years until his untimely death in 1996. Prof. Zamaraev was President of IUPAC from 1994 to 1995 and served as Chairman of the IUPAC Physical Chemistry Division from 1987 to 1989. He was also the Director of the Boreskov Institute from 1984 to 1995, and he made considerable contributions to the establishment of relationships between fundamental and applied areas of catalysis. Prof. Zamaraev's comprehensive approach to the application of physical methods to catalytic studies is inherent in the work of the Boreskov Institute in Novosibirsk today.

Organizers of the conference, besides IUPAC, included the International Association for the Promotion of Cooperation with Scientists from Independent States of the Former Soviet Union (INTAS), the Russian Foundation for Basic Research (RFBR), the Russian Mendeleev Chemical Society (Novosibirsk Department, Russia), and the Russian Scientific Council on Catalysis (Moscow, Russia). Almost 200 chemists, mostly from scientific research centers and universities in Germany, France, the United States, the United Kingdom, the Netherlands, Italy, China, Korea, Belgium, Japan, Spain, Ireland, Russia, Kazakhstan, Ukraine, Azerbaijan, and Belarus, attended the conference.

The scientific program included 12 invited plenary lectures, 12 keynote lectures, 32 oral presentations, and

98 posters covering the following topics:

- quantum-chemical studies on the electronic structure of active components in catalysts, and molecular adsorption at active sites
- physical methods for surface science studies and studies of adsorption processes
- experimental studies on the structure of active sites of heterogeneous catalysts and on the elementary mechanisms of heterogeneous catalytic reactions
- experimental studies on elementary mechanisms of homogeneous catalytic reactions
- development of new methods and approaches to *in situ* catalytic studies

Studies of heterogeneous catalysis by various *in situ* methods revealed a distinct difference between the state of catalysts in equilibrium with the ambient environment and those in nonequilibrium conditions with the reaction medium. This finding is of real interest to several IUPAC commissions that are developing recommendations for application of new methods of studies of chemically reactive systems. We will probably soon need a correction of existing terminology or development of special glossaries for describing very complicated nonequilibrium phenomena. Of special interest to IUPAC's analytical chemistry commissions was the presentation of a largely new analytical method called "differential dissolution", which aims to determine rapidly the phase composition of complex multiphase solids without any reference samples. This method appears to be very sensitive when coupled with modern atomic analyzers; it is able to distinguish seven to eight different phases in a sample of microgram weight.

Nineteen research projects funded by INTAS were discussed at the Scientific INTAS session organized by the INTAS Secretariat to run simultaneously with the conference. The conference also featured presentations by the Boreskov Institute of Catalysis, IUPAC, and INTAS, and there was an exhibition of analytical equipment sponsored by Shimadzu Europa GmbH.

Other conference activities included evenings of music and dance, excursions, and a special sightseeing program for accompanying persons. A postconference tour of the wonderful Altay Mountains also took place.

A book of abstracts of the conference manuscripts, edited by Prof. V. N. Parmon and Prof. D. I. Kochubey, was published and distributed to participants at the meeting. The main contributions will also be published after the conference in a special issue of the *Journal of Molecular Catalysis*.

**Professor V. N. Parmon, Conference Chairman
and Institute Director**

Mrs. L. Ya. Startseva, Conference Secretary
Boreskov Institute of Catalysis
Novosibirsk, Russia

10th International Symposium on Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS 10), 18–22 July 1999, Versailles, France

This symposium attracted an audience of 1 100 people, 984 of whom were active researchers. Attendees came from 36 countries, including 316 from France and 678 from abroad. There were 5 plenary lectures, plus an award lecture, 15 invited lectures, 29 contributed papers and short communications, and 542 poster presentations. The conference was well organized, with many young, active participants. Because the conference organizers were able to attract many important sponsors and thus markedly reduce fees, OMCOS 10 was open to unprecedented numbers of young researchers and to important contributors from Eastern Europe.

The idea of the OMCOS symposia originated 20 years ago in IUPAC's Division of Organic Chemistry. Since then, each event in the series became a milestone, thus demonstrating that the philosophy behind OMCOS is relevant and timely. Each of the symposia marked a new level reached by organic synthesis aided by organometallics, thus serving as a stimulus to push further ahead research joining organic synthesis, coordination chemistry, catalysis, etc.

OMCOS 10, too, became a true feast of the fascinating science of organometallic synthetic methodology, combining brilliant organization, great research, and a memorable historical stage. The conference chairman, Prof. Jean-Pierre Genet, and his team worked very hard, and their efforts were fully rewarded. The conference halls were always filled; even the temptations of beautiful Versailles and the impressive social program did not divert many people from witnessing the dramatic live performances given by masters of the art of synthesis.

The overall level of any symposium is defined by the level of the top speakers. In this respect, the level of OMCOS 10 was among the highest. Beginning with the introductory speech of Prof. Jiro Tsuji, one of the founding fathers of organic synthesis aided by organometallics, and including lectures by leading scientists such as R. Noyori, D. Evans, M. Reetz, and many others, the conference program offered something satisfying for everybody. Many former chairmen of previous OMCOS meetings took part in OMCOS 10.

Enantioselective transition metal catalysis served as the center of discussions. A large share of presentations dealt with design and synthesis of enantioselective catalysts and chiral ligands, and with their applications in both new and well-known reactions. But OMCOS 10 differed from earlier symposia in the series by its display of much deeper interest in the use of transition metal catalysis for the preparation of new materials.

This rapidly growing area continues to capture more and more attention.

Professor Irina Beletskaya
Department of Chemistry
Moscow State University, Moscow, Russia

1st IUPAC Workshop on Advanced Material: Nanostructured Systems (WAM-1), 19–22 July 1999, Hong Kong, China

This meeting represents the first of IUPAC's efforts to become involved in the identification and characterization of novel research directions by the organization of workshops on new directions in chemistry. Hong Kong University for Science and Technology (HKUST) and the Georgia Institute of Technology, Athens, GA, USA were IUPAC's cosponsors for WAM-1, which focused on the theory, synthesis, and properties of nanoparticles; quantum dots and quantum wells; nanotubes; nanowires and nanorods, self-assembly; bio-inspired structures; and nanotechnology.

WAM-1 grew out of the belief that new research fields, where the activity is truly international, are expected to contribute to high-quality, significant scientific development and to constitute the cutting edge for new technologies. The idea of holding the meeting in Hong Kong was to get scientists active in advanced materials research from the West to interact strongly with those from the Orient. Indeed, this first workshop has fulfilled the twin goals of international representation and high technical quality, with participation of 59 scientists from 14 countries (7 from the Far East: China (both mainland and Hong Kong), Japan, Korea, Philippines, Singapore, and Taiwan; and 7 from the West: Canada, France, Germany, Israel, Spain, the United Kingdom, and the United States) in a program of scientific presentations of extremely high technical merit.

In an act of serendipity that made the timing of WAM-1 as exciting as its content, on the last day of the meeting the *New York Times* published an article entitled "Computers Poised for a Great Leap", which emphasized the role of nanostructures in new molecular computer technology. The publicity reverberated worldwide and further reinforced IUPAC's wisdom in beginning to sponsor workshops in frontier areas of chemical research.

Manuscripts from WAM-1 will be published in a special issue of *Pure and Applied Chemistry*.

Professor Mostafa El-Sayed, Chairman
WAM-1 Organizing Committee

Professor Joshua Jortner, President of IUPAC

19th Discussion Conference on
Rheology of Polymer Systems,
19–22 July 1999,
Prague, Czech Republic

This conference was the 58th meeting in the series of Prague Meetings on Macromolecules, organized by the Institute of Macromolecular Chemistry of the Academy of Sciences of the Czech Republic under the auspices of the IUPAC Macromolecular Division. The aim of the conference was to provide a discussion forum for experts in the field of polymer rheology, with special emphasis on a structural understanding of macroscopic phenomena of multiphase systems.

The program committee, with Dr. Ivan Fortelený as Conference Chairman, succeeded in arranging a very interesting scientific program with many prominent speakers. Attendees included 73 participants from 23 countries. The topics of the conference were covered in 6 main lectures, 70 special lectures, and 27 poster contributions. In addition, two panel discussions were organized on problems of rheometry and processing in multiphase polymer systems (discussion leader: A. Ya. Malkin, Russia) and problems of the description of structure formation and evolution in molten multiphase polymer systems (discussion leader: J. Lyngae-Jørgensen, Denmark).

Main lectures included the following: “Quantitative predictions of the viscoelasticity of polymer melts” (R. G. Larson, USA), “Wall slip of polymer melts—measurement and industrial relevance” (H. M. Laun, Germany), “Some unusual rheology–morphology relationships in polymer blends” (V. G. Kulichikhin, Russia), “Long-time relaxations in rubber-modified polymer systems” (Y. Aoki, Japan), “Rheology of immiscible blends: relations to structure” (J. Mewis, Belgium), and “Rheology of reactive polymer blends” (A. Muller, France).

The meeting was well organized, and the program was conducted in a smooth and efficient manner. There were sufficient opportunities for vivid and fruitful discussions. In addition to the scientific program, the participants enjoyed a welcoming reception, an interesting excursion to historic places in the surroundings of Prague, and a splendid conference dinner.

Both the main lectures and special lectures will be published as a volume of *Macromolecular Symposia*.

Dr. H. M. Laun
Titular Member, IUPAC Commission IV.2 on
Polymer Characterization and Properties

Analytical Science into the Next
Millennium (SAC 99),
25–30 July 1999,
Dublin, Ireland

This conference, cosponsored with IUPAC by the Analytical Division of The Royal Society of Chemistry, attracted 300 participants from all over the world. Each morning there was a plenary session, followed by three parallel sessions in the afternoon. Every session had a distinct subject theme. There were 9 plenary lectures and 13 invited lectures among the 44 talks given at the conference. In addition, 100 posters were displayed, and a special poster discussion session was held on Thursday afternoon.

Plenary lectures covered topics of the sessions that followed. At the opening ceremony, D. T. Burns (Queen’s University, Belfast, Northern Ireland) spoke on the “Irish contribution to analytical chemistry”. T. Layloff (U.S. Food and Drug Administration, Washington, DC, USA) opened the session on Analysis for the Public Good with his talk “Analytical regulatory challenges: a world changed from cottage industries to mega-multinationals”. The next session on Process Analysis and Control featured A. Garrison (University of Tennessee, Knoxville, USA) lecturing on “Optimal utilization of analyzers in control”. A session on Molecular Recognition and Sensors began with O. Wolfbeis (University of Regensburg, Germany) discussing “Molecular recognition at interfaces: the basis for advanced chemical sensing and biosensing. The last plenary session on New Developments in Analytical Instrumentation started with a talk by A. Manz (Imperial College, London, England, UK) on “Chip technology for DNA analysis”. There was also an afternoon plenary lecture by U. Th. Brinkman (Free University of Amsterdam, Netherlands) on “Multidimensionality in trace-level analysis: hyphenation and coupled column techniques”.

An enjoyable social program kept participants busy in the evenings, and visits to historical places were organized for Wednesday afternoon. Accompanying persons had full-day programs of their own. On Tuesday night, a civic reception was held in the presence of the Lord Mayor of Dublin. The conference banquet on Thursday evening was organized at the National Centre for Arts (formerly known as the Royal Hospital Kilmainham, founded in 1680). After-dinner speakers included the President of the Analytical Division of the Royal Society of Chemistry, the President of Dublin City University, and an Irish government minister. At the banquet, the SAC Gold Medal was awarded to Professor Malcolm Smyth, who headed the organizing committee of this memorable meeting.

Manuscripts from all plenary and invited speakers will be published in a special issue of The Royal Society of Chemistry's analytical journal *The Analyst*.

Professor Gyula Svehla (formerly of University College, Cork, Ireland)
Secretary, IUPAC Analytical Division V (1987–1993)

**26th International Conference on
Solution Chemistry (ICSC),
26–31 July 1999,
Fukuoka City, Kyushu, Japan**

About 470 people, including students and accompanying persons, from 25 countries attended this conference. Japanese participants numbered 337, and foreign registrants totaled 118, including 19 from the United States, 9 from France, 8 from Germany and Hungary, 7 from the United Kingdom and Australia, 3 from Korea and India, 2 from China and Taipei, 4 from Russia, 3 from Belarus and Slovenia, 2 from Estonia, 1 from Ukraine, 2 from Nigeria, and 1 from Tunisia. There were 65 students from Japan and 13 from abroad.

Although it rained almost throughout the entire conference, accompanying persons still were able to enjoy touring the landscape of Fukuoka and the northern part of Kyushu island.

Plenary lecturers included Harry Gray (USA), who spoke on "Electron tunneling in biological molecules"; Ivano Bertini (Italy), who lectured about "Solution structure of paramagnetic metalloproteins"; J. N. Israelachvili (USA), who spoke about "Hydration and electrostatic interactions between hydrophilic molecules and surfaces in aqueous solutions"; Manfred Zeidler (Germany), who presented "New results for NMR relaxation in liquids"; and Toshio Yamaguchi (Japan), who lectured on "New horizons in hydrogen-bonded clusters in solution".

The program subcommittee, chaired by Toshihiro Tominaga of Okayama University of Science, arranged nine sessions (S) and six minisymposia (M) with the following subjects and organizers:

- (S1) Theoretical approaches and computer simulations—Susumu Okazaki of Tokyo Institute of Technology
- (S2) Structure, dynamics, and fluctuation—Masaru Nakahara of Kyoto University
- (S3) Structure, thermodynamics, kinetics, and reaction mechanisms of coordination compounds in solution—Masaaki Tabata of Saga University
- (S4) Chemical thermodynamics in solution—Takayoshi Kimura of Kinki University
- (S5) Analytical and environmental aspects in solution chemistry—Tohru Miyajima of Saga University

- (S6) Bioinorganic and pharmaceutical chemistry—Akira Odani of Nagoya University and Helmut Sigel of the University of Basel
- (S7) Polymers, colloids, and interfaces in the solution phase—Hiroshi Maeda of Kyushu University
- (S8) Role of reaction field in organic chemistry: Theory and experiment—Hiroshi Yamataka of Osaka University
- (S9) Industrial applications of solution chemistry—Isao Taniguchi of Kumamoto University
- (M1) Equilibrium and nonequilibrium theories of molecular liquids—Fumio Hirata of the Institute for Molecular Science
- (M2) Fast reaction dynamics in solution—Tadashi Okada of Osaka University
- (M3) Recent progress in redox chemistry of coordinated compounds and metalloenzymes—Yoichi Sasaki of Hokkaido University
- (M4) Hydrophobic interactions in complex and organized systems—Shinobu Koda of Nagoya University
- (M5) Recent progress of nonaqueous and mixed solvents in analytical and inorganic chemistry—Haruhiko Yokoyama of Yokohama City University
- (M6) How much do we know about water at the molecular level?—Hiroyasu Nomura of Nagoya University

Participants at the conference presented 337 papers, including 5 plenary lectures, 135 oral presentations (invited and contributed papers), and 197 posters. All lecture rooms seemed to be full during the entire conference, and enthusiastic discussions occurred at every session.

In addition to the scientific sessions and minisymposia, there was a Fukuoka Forum for Citizens, entitled "Science of Water" on the afternoon of 29 July when most foreign participants enjoyed the traditional half-day excursion of the conference. The forum, which featured lectures in Japanese by H. Ohtaki (Ritsumeikan University), Nobuyuki Nishi (Institute for Molecular Science), Koji Yamanaka (Organo Co., Ltd.), and Yasushi Kitano (Nagoya University), attracted about 150 nonscientific people from the town of Fukuoka.

Attendees enjoyed a get-together party on 26 July, a reception on 27 July, a concert with the Japanese instruments "koto" and "shamisen" on 28 July by Mrs. Prof. Tabata and her student, a traditional half-day excursion on 29 July to visit Arita (the town of porcelains, sometimes called "imari" in Europe) and Karatsu and to enjoy a boat cruise on Hakata Bay, and the conference banquet on 30 July. A postconference tour was organized to visit Kumamoto Castle, Aso volcanic mountain, and a Sake brewery company in Hita city. Besides these social events, a rich program was made available for accompanying persons every day of the conference.

This conference enjoyed the highest attendance in the history of the ICSC, and many participants commented on the high quality of the presentations, the wide scope of topics in solution chemistry, and the excellent program for accompanying persons (planned by Prof. Tohru Miyajima of Saga University and the local subcommittee).

Financial support for the conference was given by the Science Council of Japan, 16 organizations and foundations, and many private companies to ensure its sound financing in spite of the serious economic situation of Japan at present.

At the international steering committee meeting on the evening of 28 July, Manfred Zeidler of Aachen, Germany, who will be Chairman of the 27th ICSC, discussed preparations for the next conference to be held 26–31 August 2001 in Vaals, Netherlands. Members of the steering committee received copies of the first circular for the 27th ICSC, and they also decided to hold the 28th ICSC in Debrecen, Hungary with Gabor Palinkas of Budapest as Chairman.

Professor Hitoshi Ohtaki
Department of Chemistry, Ritsumeikan University
Chairman of 26th ICSC and IUPAC Bureau
Member

14th International Symposium on Plasma Chemistry (ISPC-14), 2–6 August 1999, Prague, Czech Republic

This biennial symposium encompassed the whole area of plasma chemistry, with topics ranging from the basic physics and chemistry of thermal and low-pressure nonequilibrium (cold) plasmas to industrial processes, processing techniques, and equipment. ISPC-14 included a Plasma Equipment Exhibition and was preceded by a three-day Summer School on Plasma Chemistry (29–31 July) and followed by a two-day Workshop on Industrial Applications of Plasma Processing (6–7 August).

Of the 510 attendees at ISPC-14, 76 were Czech and 434 came from 42 other countries. The 553 contributions included 8 invited plenary lectures, 18 invited topical lectures, 158 oral presentations, and 369 posters. The five-volume symposium proceedings contained 486 papers amounting to 2 877 pages. Specific topics included basic physical and chemical processes in plasmas, modeling and diagnostics of plasmas, plasma generation, plasma–particle interaction, plasma–surface interaction, plasma etching, plasma CVD, plasma synthesis, plasma spraying, plasma metallurgy, environmental applications, and industrial applications.

The summer school attracted 33 participants to its course on low-pressure nonequilibrium plasmas, and 29 people attended the course on thermal plasmas. The

workshop included a total of 12 lectures, with four each on the topics of thermal plasmas, plasma surface processing, and plasma polymerization.

Social events associated with ISPC-14 included a welcoming party on Monday, a concert on Tuesday, tours and a visit to the Institute of Plasma Physics on Wednesday, and a dinner on Thursday.

The next symposium in the series, ISPC-15, also with a summer school and workshop, will be held in Orléans, France in July 2001.

Professor André Ricard
Chairman, IUPAC Physical Chemistry Division (I)
Subcommittee on Plasma Chemistry

Horizons of Organic and Organoelement Chemistry, 6–10 September 1999, Moscow, Russia

This conference was dedicated to Academician Aleksander N. Nesmeyanov (1899–1980) on the 100th anniversary of his birth. Professor Nesmeyanov was an outstanding Russian scientist, brilliant chemist, and gifted scientific administrator. He was president of the Russian Academy of Sciences, rector of M. V. Lomonosov Moscow State University, and initial director of the Institute of Organoelement Compounds named after him. Professor Nesmeyanov was a member of a number of foreign academies and societies and received honorary doctorates from many western universities.

Professor O. M. Nefedov gave a talk at the opening ceremony as official IUPAC representative and Vice-President of the Russian Academy of Sciences. The conference attracted 455 scientists, including 421 from Russia, 4 from the United States, 4 from the United Kingdom, 4 from Germany, 3 from Switzerland, 1 from Portugal, 1 from Japan, 4 from China, 1 from South Korea, 1 from Poland, 1 from the Czech Republic, 5 from Latvia, 1 from Ukraine, and 4 from Belarus. There were 10 plenary lectures, 32 invited lectures, 22 oral presentations, and 200 poster presentations. Many young scientists from different regions of Russia gave 18 oral presentations and presented 112 posters.

The scope of the conference covered synthesis, structures and reactivity, stereochemistry, catalysis, physical methods of investigation, and new materials and technology. It also encompassed the 7th Open Russian Conference on Organometallic Chemistry, a school–conference for young scientists on Organometallic Chemistry Towards the 21st Century, and sections on organic chemistry and organophosphorus compounds.

The conference admirably achieved its stated goals of summing up the results of fundamental and applied organic and organoelement chemistry and of defining the perspectives of development and selecting those ar-

ease that demand united international efforts. The meeting provided an important forum for consolidating the current efforts of Russian scientists with those of researchers from abroad.

Professor Yuri N. Bubnov
Chairman of the Organizing Committee

New Books and Publications

New Books from IUPAC

***Organic Mesoscopic Chemistry. Chemistry for the 21st Century Monograph.* Edited by H. Masuhara and F. C. de Schryver. Blackwell Science (1999), pp. ix + 1–304. ISBN 0-632-05125-6, USD 100.**

Contents

Theoretical Approaches to Dynamics in Nanoscale System; Photoinduced Jumps of Single Molecules: Probing Structural Relaxation in Solids on a Nanoscopic Scale; Dual and Single-Molecule Fluorescence Spectroscopy: Towards Kinetic Observation of Single Molecule Reactions; Space-Resolved Study of Porphyrin Rings: Local Optical Properties and Formation Mechanism; Laser Chemistry of Individual Microparticles; Hierarchical Structuring of Nanostructured 2-Dimensional Polymer Assemblies; Dynamics and Photochemistry of 2-Dimensional Molecular Crystals at the Liquid–Solid Interface; The Organic Microcrystals; Spectroscopic Analysis of Inhomogeneous Structures in Single Microparticles; A Miniaturized Total Chemical Analysis System; Imaging Single Cells and Single Molecules; Analytical Chemistry and Biophysics in the Single Molecular Level

This book is one in IUPAC's series entitled *Chemistry for the 21st Century*. The aim of this series is to gather together articles about areas of chemistry in which there is currently much active research and those that potentially will have an important impact on chemistry in the future.

Most chemical reactions have been studied in gas phase and solution systems; however, these systems are relatively homogeneous and, hence, space-resolved chemistry has not received much attention. However, the development of confocal optical microscopy and the invention of various types of scanning probe microscopy have led to the concept of space resolution in chemistry. Microscopy techniques, combined with solid–phase chemistry and the study of position-dependent physical and chemical properties, the effect of dopants and defects, surface and interface reactions, and fabricated and modified functionality, are now considered to be fascinating subjects. Furthermore, laser spectroscopy can be extended to such small domains: a laser beam can be focused to the diffraction limit and penetrates as an eva-

nescent wave; in addition, its photon density is very high, and short pulses are available. Thus, the combination of laser and microscopy techniques has opened up new areas of research in the field of organic mesoscopic chemistry.

The volume focuses on organic molecular systems and reviews relevant fields of active research. The importance of the mesoscopic dimension in chemistry is explained in the Introduction. Chapters 1–12 summarize research in different areas. Chapter 1 discusses theoretical approaches to dynamics in nanoscale systems, while Chapters 2 and 3 describe studies on single molecules. Chapters 4 and 5 present molecular aggregates and microparticles as representative examples of space- and time-resolved spectroscopy and chemistry. Chapter 6 discusses the hierarchical structure of polymer assemblies, and Chapter 7 provides an overview of organic microcrystals. Advances in analytical chemistry are now firmly rooted in the mesoscopic dimension, and Chapters 8–12 present new aspects of relevant fields.

The editors are grateful to all the contributors for accepting our invitation and for taking the time to write their detailed chapters. We also wish to thank Blackwell Science for the fine job they have done in the production of this volume.

**H. Masuhara, Department of Applied Physics,
Faculty of Engineering, Osaka University, Suita,
Japan**

**F. C. de Schryver, Department of Chemistry,
Katholieke Universiteit Leuven, Heverlee,
Belgium**

Japanese Translation of Natural and Anthropogenic Environmental Oestrogens: The Scientific Basis for Risk Assessment. Special Issue of Pure and Applied Chemistry (Vol. 70, No. 9, 1998).

Edited by A. N. Wright and A. E. Fischli;

**Translation coordinated by Junshi Miyamoto.
IUPAC (1999), pp. xvi + 1–350. ISBN 4-87326-315-8, JY 12 000.**

Please refer to the article under “News from IUPAC” on page 7 of this issue for details on the content of this book and how to obtain a copy of it.

New Products from IUPAC and Academic Software

SolEq: Solution Equilibria, Principles and Applications. 1999. On CD for Windows 95, 98, and NT. Published and distributed by Academic Software; Web site: <http://www.acadsoft.co.uk>; E-mail: soleq@acadsoft.co.uk

The SolEq tutorials on Solution Equilibria result from collaboration between Academic Software (UK) and IUPAC Commission V.6. Their completion was marked by a small celebration at the Berlin General Assembly on 8 August 1999.

SolEq is an exciting new product—a totally new concept for teaching solution equilibria and environmental chemistry. It contains 27 tutorials on solution equilibria, covering both principles and applications. Tutorials link to 8 software packages that provide the student/researcher with the tools necessary to complete equilibrium calculations on complex systems. SolEq tutorials link theory with calculations and with applications such as acid rain, soil weathering, metals in natural waters, marine CO₂, metals in blood plasma, and chelation therapy.

Tutorial topics include acids-bases-buffers (3 tutorials), redox and electron activity (3), metal–ligand systems (6), energetics (2), heterogeneous equilibria (3), titration simulations (2), and speciation calculations. Software packages provide a powerful speciation program (Species); a subset of SC-Database; buffer calculations; simulations of acid-base, metal–ligand, redox, and precipitation titrations; and correction of log K for I and T.

SolEq tutorials have a soft book format. Hypertext links are used extensively to include illustrations, graphs, tables, worked examples, mathematical deri-

vations, etc. To obtain a hard copy, the user can download tutorials as Microsoft Word files for printing in A5 format. From tutorial pages, exercises link interactively with software packages via toolbar icons. All exercises have fully worked answers.

The principal target group is university/polytechnic senior undergraduates, but SolEq will also be invaluable to university and industrial researchers and non-specialists who require equilibrium modeling skills.

The tutorials are the culmination of writing contributions from many countries, including the United Kingdom, Sweden, Hungary, Kenya, Russia, New Zealand, and the United States. They have been tested with student groups in Russia, Brazil, New Zealand, the United Kingdom, and Sweden and refined on the basis of student feedback.

Marketing is by Academic Software. For further information, downloadable demonstration tutorials, and purchasing information, see the Academic Software web site at <http://www.acadsoft.co.uk>.

Professor Kip Powell
Chairman, IUPAC Commission on Equilibrium Data (V.6)

New Book from The Royal Society of Chemistry

Metabolic Pathways of Agrochemicals, Part 2, Insecticides and Fungicides. Editors-in-Chief: Terry R. Roberts (JSC International Ltd., UK) and David H. Hutson (Consultant, UK).

The Royal Society of Chemistry announces that Part 2 of its major reference source *Metabolic Pathways of Agrochemicals* is now available. Covering *Insecticides and Fungicides*, Part 2 complements Part 1, *Herbicides and Plant Growth Regulators*, which was published in 1998. Together, this two-volume publication provides comprehensive coverage of chemical degradation and metabolism of agrochemicals in soils, plants, and animals.

Containing information on over 300 chemicals currently in use, Part 2 also encompasses nematicides, rodenticides, insect growth modulators, and plant activators in addition to insecticides and fungicides. Part 2 contains details on all the important classes of active ingredients, including organophosphate and pyrethroid insecticides, azoles, and the newly developed strobilurin fungicides. Modulators of insect growth and behavior are discussed, as are the fates of most cur-



SolEq Celebration at IUPAC Berlin General Assembly on 8 August 1999.

rently used rodenticides and nematicides. Organized by compound class and covering 40 years of literature, including previously unpublished information from agrochemical companies, *Metabolic Pathways of Agrochemicals* comprises the following:

- separate entries for each pesticide
- overviews of the metabolism of specific classes of agrochemicals
- key similarities and significant differences between individual chemicals in the class
- extensive bibliography
- comprehensive, high-quality indexes (chemical/common name, CAS registry number, reaction type)

Compiled by a highly respected team of international editors, each part of *Metabolic Pathways of Agrochemicals* can be purchased individually or as a set.

The Royal Society of Chemistry is a learned and professional society with a worldwide membership of 46 000. It has as its main objective the advancement of the science of chemistry and its applications, and the maintenance of high standards of competence and integrity among practicing chemists. The society has been involved with the publication of scientific literature since 1841. Surplus cash generated from sales funds the promotion of chemistry.

ISBN: 0-85404-499-X; xxiv + 1 486 pages; Price: GBP 225.00; Hardcover, 1999.

To order, contact Sales and Customer Care, The Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, England CB4 0WF, UK; E-mail: sales@rsc.org; Tel.: +44 1223 420066; Fax: +44 1223 423429; Web site: <http://www.rsc.org/metpath> or <http://www.chemsoc.org/>.

Awards and Prizes

Stephen Heller Wins American Chemical Society Award

Dr. Stephen R. Heller, Member of IUPAC's Committee on Printed and Electronic Publications (CPEP) and guest researcher at the National Institute of Standards and Technology, Gaithersburg, MD, USA, has won the prestigious Herman Skolnik Award of the American Chemical Society Division of Chemical Information for 2000, jointly with G. W. A. (Bill) Milne, the Editor of the *Journal of Chemical Information and Computer Sciences*.

Thomas Tidwell Wins Royal Society of Chemistry Award

Prof. Thomas T. Tidwell, Secretary of IUPAC's Organic Chemistry Division (III) and Professor in the Department of Chemistry, University of Toronto, Ontario, Canada, is the winner of the 1998 Royal Society of Chemistry Award for Organic Reaction Mechanisms, sponsored by the BP Research and Engineering Centre.

Conference Announcements

Practical Experiences in the Use of Transgenic Crops, 25 January 2000, London, England, UK

Topics to be discussed at this meeting include the following:

- benefits and issues related to the use of transgenic crops
- transgenic corn—the way forward
- why the American Soybean Association supports transgenic soybeans
- transgenic crops: a view from the United States Extension Service
- agricultural and commercial advantages of transgenic crops
- commercial opportunities and farmer value
- importance of genomics to the future of crop production
- industry perspective

For additional information, contact Sonia at the Society of Chemical Industry, 14/15 Belgrave Square, London SW1X 8PS, England, UK; E-mail: soniaw@chemind.demon.co.uk; Tel.: +44 171 235 3681; Fax: +44 171 823 1698.

11th Royal Australian Chemical Institute Convention (11RACIC): Chemistry into the New Millennium, 6–11 February 2000, Canberra, Australia

This conference, held at the Australian National University in Canberra every four years, is a major activity of the Royal Australian Chemical Institute. Chemists worldwide are invited to participate in this major scientific gathering of national and international authorities in all areas of chemistry. Emphasis will be on innovative ideas for future research in chemistry.

For further information, contact Conference Logistics, P.O. Box 505, Curtin, ACT 2605, Australia; E-mail:

conference@conlog.com.au; Tel.: +61 2 6281 6624; Fax: +61 2 6285 1336; or view the conference web site at <http://www.IIRACIC.conf.au/>.

Membrane Technology in Water and Wastewater Treatment, 26–29 March 2000, Lancaster, England, UK

This meeting at Lancaster University, sponsored by the Separation Science and Technology Group of the Society of Chemical Industry, the Royal Society of Chemistry Water Chemistry Group, Institute of Chemical Engineers (IChemE), and the European Desalination Society, will cover the treatment of ground and surface water, backwash water, seawater, and industrial and domestic wastewaters. The aim of the event is to promote the use of membrane technology using microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), and reverse osmosis (RO) for a range of water treatment applications.

For more information, contact Mrs. E. Wellington; E-mail: confsec@dial.pipex.com; Tel./Fax: +44 1275 853311.

2nd International Conference on Genomics, 29–31 March 2000, Cambridge, England, UK

Genomics is poised to play an increasing role in medicine and agriculture. In the next few years, the complete sequences of hundreds of genomes will be available, and recent developments have indicated that the human genome sequence will be finished ahead of the 2005 target date. These sequence data will be accompanied by a vast amount of additional information, including results of comparative genomics, RNA and protein expression profiles, functional and pathway information, and tools for molecular and cell biology.

Providing a broad, in-depth overview of new discoveries and commercial developments, this conference, to be held at Churchill College, Cambridge University and cosponsored by the Society of Chemical Industry Bioactive Sciences Group and Cambridge and Great Eastern Section, will look at how this wealth of information is going to be interpreted; how information will be managed and shared; the impact genomics has had in the commercial environment; and what are the future opportunities for exploitation of genomic information?

For additional information, contact L. G. Copping; Tel./Fax: +44 1799 521369 or G. Dixon, Tel.: +44 1625 513305; Fax: +44 1625 517436.

Hazards XV—The Process, Its Safety, and The Environment—Getting It Right, 4–6 April 2000, Manchester, England, UK

Cosponsors for this meeting at the Manchester Materials Science Centre (UMIST) include the Society of Chemical Industry Health and Safety Group and the Institute of Chemical Engineers (IChemE). Discussion topics include the impact on new technology, environmental impact (including the new Integrated Pollution Prevention and Control Regulations), safety and the environment, emergency planning, and transportation and storage of hazardous chemicals.

For further information, contact Mr. M. J. Adams; E-mail: mikeadams@valrichardson.com; Tel.: +44 1539 732845; Fax: +44 1539 724055.

International Conference on Metrology—Trends and Applications in Calibration and Testing Laboratories, 16–18 May 2000, Jerusalem, Israel

This Forum is being organized by the National Conference of Standard Laboratories (NCSL), the Cooperation International for Traceability in Analytical Chemistry (CITAC), and the Israeli Metrological Society. Topics to be covered include the following:

- metrology as a science and as an integral part of business in industry and trade
- legal metrology
- regional metrological organization
- measurement methods and their validation
- instruments and their qualification
- measurement standards and reference materials
- interlaboratory comparisons
- proficiency testing
- uncertainty in measurement and analysis
- traceability
- laboratory information management systems
- accreditation of calibration and testing (analytical) laboratories
- ethical problems in metrology
- education in the third millennium

For more information, contact Dr. Henry Horwitz, Conference Secretariat, ISAS—International Seminars, P.O. Box 34001, Jerusalem 91340, Israel; E-mail: isas@netvision.net.il; Tel.: +972 2 652 0574; Fax: +972 2 652 0558.

Symposium on Reference Materials for Technologies in the New Millennium, 21–23 May 2000, Berlin, Germany

This symposium, jointly organized with EURACHEM and other institutions, will provide an opportunity for international exchange of information on, and experi-

ence with, reference materials (RM) between prominent RM users and producers with a focus on materials analysis. Sessions will be dedicated to specific topics in the following areas:

General aspects

- providing RMs with traceable specifications and how to use them to establish traceability in chemical measurement
- certification strategies
- RM types and categories, RM databases

Certification of chemical composition

- pure materials and elemental solutions
- metal matrices, ceramics, and glasses
- semiconductors and high-tech materials

Certification of physical properties

- porous materials, particle-size RMs
- chromatography-column materials
- multiphase systems

Invited lectures, as well as contributed oral and poster presentations, will show the latest state of development in these fields.

For further information on submitting oral/poster contributions and/or on participating in the symposium, contact Dr. P. Klobes, Federal Institute for Materials Research and Testing (BAM), Dept. I.1, Richard-Willstaetter-Str. 11, D-12489 Berlin, Germany; E-mail: peter.klobes@bam.de; Tel.: +49 30 6392 5825; Fax: 49 30 6392 5972.

2000 London International Chlorine Symposium, 31 May–2 June 2000, London, England, UK

This meeting, sponsored by the Society of Chemical Industry Electrochemical Technology Group, is to be held at the Gloucester Hotel. The symposium aims to build on the success and popularity of past symposia in the series and to look toward the future of chlorine as well as to address technological developments, associated safety and environmental issues, and the economic outlook for chlorine.

For more information, contact the Society of Chemical Industry Conference Department, 14/15 Belgrave Square, London SW1X 8PS, England, UK; E-mail: members@chemind.demon.co.uk; Tel.: +44 171 235 3681; Fax: +44 171 823 1698.

IUPAC Workshop on Atmospheric Deposition and Impacts on Ecosystems with Particular Reference to the Mideast, 5 June 2000, Tel Aviv, Israel

Atmospheric deposition of pollutants on fresh water ecosystems is particularly relevant for regions and coun-

tries in the arid zones, such as the Middle East including Israel. This short symposium, sponsored by IUPAC, the Israel Ministry of Science, and the Israel Chemical Society, is intended to bring together internationally recognized experts in the field of atmospheric deposition with other scientists who are working on this topic in Europe, the Middle East, and elsewhere, and with members of the IUPAC Division of Environmental Chemistry (VI); Commission on Atmospheric Chemistry (VI.2); and Commission on Soil and Water Chemistry (VI.3). Points of discussion will include the following:

- cause–effect relationships between deposition and factors affecting the conditions and the health of ecosystems
- monitoring and estimation tools to overcome interdisciplinary and international transboundary problems
- interactions and synergisms between pollutants and predictive understanding of integrated land/water systems

This one-day symposium will include three sessions of 2.5 hours each, all starting with two tutorial overviews on wet and dry deposition, followed by contributed presentations. Topics to be covered include the following:

- fundamentals of dry deposition
- fundamentals of wet deposition
- atmospheric deposition over Europe
- atmospheric deposition over Israel
- Great Lakes atmospheric deposition studies
- Kineret Lake atmospheric deposition studies
- atmospheric deposition on the eastern coast of the Mediterranean Sea
- atmospheric dust and cloud physics and chemistry

There will also be a panel discussion featuring representatives of the Israeli Ministry of the Environment, the United States Environmental Protection Agency, IMAP or IGBP, and EUROTRAC.

For additional information, contact Prof. Rene van Grieken, Micro- and Trace Analysis Center, University of Antwerp (UIA), B-2610 Antwerp, Belgium; E-mail: vgrieken@uia.ua.ac.be; Tel.: +32 3 8202362 or +32 477 702165 (mobile); Fax: +32 3 8202376; Web site: <http://inch.uia.ac.be/u/vgrieken/> or contact Dr. Yehuda Shevah, Tahal Consulting Eng. Ltd., 16th O. Box 11170, Tel Aviv, 61111, Israel; E-mail: tahalcmp@netvision.net.il; Tel.: + 972 3 636 9615; Fax: +972 3 636 9754.

31st Annual Short Course on Advances in Emulsion Polymerization and Latex Technology, 5–9 June 2000, Bethlehem, Pennsylvania, USA

This one-week program at Lehigh University is designed for engineers, chemists, other scientists, and managers who are actively involved in emulsion work and for those who wish to develop expertise in the area.

The course is an in-depth study of the synthesis and properties of high polymer latexes. The subject matter includes a balance of theory and applications as well as a balance between chemical and physical problems. Lectures, given by leading academic and industrial workers, begin with introductory material and review, and progress through recent research results. The course fee is USD 1 000 for the entire week or USD 350 per day for any part.

For further information, contact Professor Mohamed S. El-Aasser, Emulsion Polymers Institute, Lehigh University, 111 Research Drive, Bethlehem, PA, USA 18015; E-mail: mse0@lehigh.edu; Tel.: +1 610 758 3082; Fax: +1 610 758 5880.

26th SCAR and 12th COMNAP, 10–22 July 2000, Tokyo, Japan

This joint meeting of the Scientific Committee on Antarctic Research (SCAR) and the Council of Managers of National Antarctic Programs (COMNAP) will be held at the National Olympics Memorial Youth Center, which is located in Shinjuku in the central part of Tokyo.

From 10–14 July, all SCAR working groups, a group of specialists on seals, JCADM, COMNAP/SCALOP, and the SCALOP Symposium (11 July) will meet. From 17–21 July, all SCAR delegates will meet, and other meetings will be convened as requested.

For more information, contact XXVI SCAR and XII COMNAP Meetings Secretariat, National Institute of Polar Research, 9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173-8515, Japan; E-mail: SCAR2000@nipr.ac.jp; Tel.: +81-3-3962-4722; Fax: +81-3-3962-2529; Web site: <http://www.nipr.ac.jp/SCAR-COMNAP-2000-TO-KYO/>.

33rd COSPAR Scientific Assembly, 16–23 July 2000, Warsaw, Poland

This meeting of the Committee on Space Research (COSPAR), also known as COSPAR 2000, will be held at the Warsaw University of Technology. The conference will be hosted jointly by the University and by the Polish Academy of Sciences (PAS). It is supported by the State Committee for Scientific Research (KBN) as the main sponsor and by numerous local institutions and science societies.

Approximately 80 meetings and symposia at the assembly will cover the following topics:

- Earth's surface, meteorology, and climate
- Earth–moon system, planets, and small bodies of the solar system
- upper atmospheres of the Earth and planets, including reference atmospheres
- space plasmas in the solar system, including planetary magnetospheres
- research in astrophysics
- life sciences as related to space
- materials sciences in space
- fundamental physics in space
- space debris
- satellite dynamics
- scientific ballooning
- radiation belts
- space weather
- integrated global observation system—role and benefits for developing countries
- public understanding of space science

Conference manuscripts will be published in *Advances in Space Research*.

For more information, contact COSPAR Secretariat, 51 bd de Montmorency, 75016 Paris, France; E-mail: COSPAR@paris7.jussieu.fr; Tel.: +33 1 45 25 06 79; Fax: +33 1 40 50 98 27; Web site: <http://www.copernicus.org/COSPAR/COSPAR.html>.

IUPAC-TACTRI/COA International Workshop on Pesticides 2000: Harmonization of Pesticide Management—Regulation, Monitoring, and Evaluation, 3–6 October 2000, Taichung, Taiwan

This workshop will be sponsored by IUPAC's Commission on Agrochemicals and the Environment (VI.4) and hosted by the Taiwan Agricultural Chemicals and Toxic Substances Research Institute, Council of Agriculture (TACTRI/COA).

The IUPAC Commission on Agrochemicals and the Environment seeks to advance research understanding and promote environmental stewardship and human safety with agrochemicals through its publications, international pesticide congresses, and regional workshops. This workshop, following highly successful IUPAC-sponsored scientific meetings during the past several years in London; Sao Paulo; Washington, DC; and Bangkok, continues the initiative to encourage exchange of the latest information on pesticide management approaches and to advance the most practical and scientific approaches around the world.

The workshop will include keynote lectures and poster presentations on the following topics:

1. Pesticide regulation

- harmonized approaches for pesticide registration
- international standards for technical grade pesticides

- international standards for pesticide MRLs
- international trade: export and import considerations
- pesticide standards for water quality
- regulation of biotechnology products
- regulation and training requirements for applicators

2. Residue analysis and monitoring

- advances in analysis methods for crops
- advances in analysis methods for soil and water
- advances in analysis methods for seafood
- sampling considerations for residue monitoring programs
- monitoring results for crops
- monitoring results for seafood
- monitoring results for soil and water

3. Risk assessment and management

- toxicological considerations for human health assessment
- chronic and acute dietary intake assessment
- measurement and mitigation of applicator exposure
- manufacturing practices to minimize worker and environmental impacts
- ecological impact assessment of pesticides
- practices to minimize pesticide waste disposal impacts
- development of pesticides with reduced risk characteristics
- government perspectives on risk management options

Workshop delegates will have the opportunity to visit laboratories engaged in pesticide residue analy-

sis, pest management, agricultural environment protection, and toxicity studies during a tour of the facilities at the TACTRI headquarters. TACTRI is on the outskirts of Taichung City, located in central Taiwan; the area has a population of one million people and is the cultural and economic heart of the central Taiwan region. Local tourist attractions include parts of the city center with Buddhist and Taoist temples, the Confucius Shrine, Cultural Center, Museums of Fine Arts and Natural Science History, as well as Sun Moon Lake and the Hsitou Forest Recreation Area.

For additional information, contact Sue-Sun Wong, Taiwan Agriculture Chemicals and Toxic Substances Research Institute, Council of Agriculture (TACTRI/COA), 11 Kung-Ming Road, Wufeng, Taichung Hsien, Taiwan; E-mail: sswong@tactri.gov.tw; Tel.: +886 4 3302101, Ext. 401; Fax: +886 4 3324738; Web site: <http://www.tactri.gov.tw/>.

Forum III of the Intergovernmental Forum on Chemical Safety (IFCS), 14–20 October 2000, Salvador, Bahia, Brazil

This meeting will conduct a full review of the organizational, administrative, and financial aspects of the IFCS Forum series of conferences, as well as an assessment of their effectiveness.

For further information, contact the IFCS, c/o World Health Organization, 20 Avenue Appia, CH-1211 Geneva 27, Switzerland; E-mail: ifcs@who.ch; Tel.: +41 22 791 4333 or +41 22 791 3650; Fax: +41 22 791 4875; Web site: <http://www.ifcs.ch/>.

Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

NEW designates a new conference since the last issue.

2000

Bio-Organic Chemistry

30 January–4 February 2000

5th IUPAC Symposium on Bio-Organic Chemistry (ISBOC-V), Pune, India.

Prof. S. Ranganathan, Discovery Laboratory, Indian Institute of Chemical Technology, Hyderabad 500 007, India.

Fax: +91 4 717 3757

E-mail:

ranganathan@iict.ap.nic.in

Materials Science

8–9 April 2000

Pre-conference Workshop

10–12 April 2000

UNESCO School and Conference on Macromolecules and Materials Science, Stellenbosch, South Africa.

Prof. R.D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials Institute for Polymer Science, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa.

Tel.: +27 21 808 3172

Fax: +27 21 808 4967

NEW

E-mail: rds@land.sun.ac.za

High-Temperature Materials Chemistry

10–14 April 2000

10th International Conference on High-Temperature Materials Chemistry, Aachen, Germany.

Prof. Klaus Hilpert, Forschungszentrum Jülich GmbH, Institut für Werkstoffe der Energietechnik (IWE 1), 52425 Jülich, Germany.

Tel.: +49 2461 61 3280

Fax: +49 2461 61 3699

E-mail: k.hilpert@fz-juelich.de

How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsorship, conference organizers should complete an Advance Information Questionnaire (AIQ). The AIQ form is available at <http://www.iupac.org> or by request at the IUPAC Secretariat, and should be returned between 2 years and 12 months before the conference. Further information on granting sponsorship is included in the AIQ and available online.

Mycotoxins and Phycotoxins

21–25 May 2000
10th International IUPAC Symposium on Mycotoxins and Phycotoxins, Sao Paulo, Brazil.
Dr. Myrna Sabino, Instituto Adolfo Lutz, AV Dr. Arnaldo 355, Sao Paulo, Brazil, 01246-902.
Fax: +455 (11) 853 3505
E-mail: Myrna@Sti.COM.BR

Polymer-Based Technology

21–26 May 2000
9th International Conference on Polymer-Based Technology (POC'2000), Tianjin, China.
Prof. Zhang Zhengpu, Institute of Polymer Chemistry Nankai University, 94 Weijin Road, Tianjin 300071, China
Tel.: +86 22 2350 1386
Fax: +86 22 2350 4853
E-mail: zhangzp@sun.nankai.edu.cn

Flow Analysis

25–29 June 2000
8th International Conference on Flow Analysis, Warsaw, Poland.
Prof. Marek Trojanowicz, Department of Chemistry, University of Warsaw, Pasteura 1, 02-093 Warsaw, Poland.
Tel/Fax: +48 22 822 35 32
E-mail: trojan@chem.uw.edu.pl

Chemical Sensors

25–29 June 2000
EUROSENSORS XIV & International Meeting on Chemical Sensors VIII (ES-IMCS' 2000), St. Petersburg, Russia.
Prof. Yuri Vlasov, Chairman
Dr. Andrey Legin, Secretary
St. Petersburg University, Universitetskaya nab. 7/9, St. Petersburg, 199034, Russia.
Tel./Fax: +7 812 328 28 35
E-mail: andrew@sensor.chem.lgu.spb.su

Organic Synthesis

1–5 July 2000
13th International Conference on Organic Synthesis (ICOS-13), Warsaw, Poland.
Prof. M. Makosza, Institute of Organic Chemistry, Kasprzaka 44, 01-224 Warsaw 42, PO Box 58, Poland.
Tel.: +48 22 631 8788
Fax: +48 22 632 6681
E-mail: icho-s@ichf.edu.pl

Physical Organic Chemistry

8–13 July 2000
15th International Conference on Physical Organic Chemistry (ICPOC 15), Göteborg, Sweden.
Prof. P. Ahlberg, Organic Chemistry, Department of Chemistry, Göteborg University, SE-412 96, Göteborg, Sweden.
Tel.: +46 31 7722900
Fax: +46 31 7723843
E-mail: Per.Ahlberg@oc.chalmers.se

Macromolecules

9–14 July 2000
38th International Symposium on Macromolecules (MACRO 2000), Warsaw/Lodz, Poland.
Prof. Stanislaw Penczek, Polish Academy of Sciences, ul. Sienkiewicza 112, 90363 Lodz, Poland.
Tel.: +48 42 81 9815
Fax: +48 42 684 7126
E-mail: spenczek@bilbo.cbmm.lodz.pl

Coordination Chemistry

9–14 July 2000
34th International Conference on Coordination Chemistry (34-ICCC), Edinburgh, Scotland.
Prof. P. Tasker, Chairman
Dr. John F. Gibson, Secretary
The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.
Tel.: +44 171 440 3321
Fax: +44 171 734 1227
E-mail: gibsonj@rsc.org

Polymers in Medicine

17–20 July 2000
40th Microsymposium Polymers in Medicine, Prague, Czech Republic.
Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Science of the Czech Republic, Heyrovského nam. 2, 162 06 Praha 6, Czech Republic.
Tel.: +420 2360341
Fax: +420 2367981
E-mail: sympo@imc.cas.cz

Polymer Networks '2000

17–21 July 2000 **NEW**
15th Polymer Networks Group Meeting "Polymer Networks '2000", Cracow, Poland.
Prof. H. Galina, Rzeszow University of Technology, Faculty of Chemistry, W. Pola Str.2, PL 35-959 Rzeszow, Poland.
Tel.: +48 17 628 057
Fax: +48 17 854 3655
E-mail: hgal@prz.rzeszow

Photochemistry

22–27 July 2000
18th IUPAC Symposium on Photochemistry, "Photochemistry into the New Century", Dresden, Germany.
Prof. Dr. Silvia E. Braslavsky, Max-Planck Institut fuer Strahlenchemie, Postfach 101365, D-45413 Muelheim an der Ruhr, Germany.
Tel: +49 (208) 306 3681
Fax: +49 (208) 306 3951
E-mail: braslavskys@mpi-muelheim.mpg.de

Organometallic Chemistry

23–28 July 2000

19th International Conference on Organometallic Chemistry (XIX ICOMC), Shanghai, China.

Profs. Li Xin Dai and Chang Tao Qian, Chairmen, Prof. Xue Long Hou, Secretary, Shanghai

Institute of Organic Chemistry, Chinese Academy of Sciences, 354 Fenglin Road, Shanghai 200032, PR, China,

Tel.: +86 21 641 63300

Fax: +86 21 641 66128

E-mail: xlhou@pub.sioc.ac.cn

Solubility Phenomena

25–28 July 2000

9th International Symposium on Solubility Phenomena (9th ISSP), Hammamet, Tunisia.

Prof. Najia Kbir-Arighuib, National Institute for Scientific and Technical Research, P.O. Box 95, Hammam-Lif, 2050 Tunisia.

Tel.: +216 1 430 215

Fax: +216 1 430 934

E-mail: arighuib@planet.tn

Chemical Education

5–10 August 2000

16th International Conference on Chemical Education: Chemistry for a Healthier Planet (16 ICCE), Budapest, Hungary.

Prof. Alajos Kalman, Chairman, Prof. Gabor Naray-Szabo, Department of Theoretical Chemistry, Lorand Eotvos University, Pazmany Peter st. 1b, H-1117 Budapest, Hungary.

Tel.: +36 1 209 0555, ext. 16-30

Fax: +36 1 209 0602

E-mail: mail2.mke@mtesz.hu

Chemical Thermodynamics

6–11 August 2000

16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, Canada.

Prof. M. A. White, Department of Chemistry, Dalhousie University, Halifax, Nova Scotia B3H 4J3, Canada.

Tel.: +1 902 494 3894

Fax: +1 902 494 1310

E-mail:

Mary.Anne.White@DAL.CA

Thermal Analysis and Calorimetry

14–18 August 2000

12th International Congress on Thermal Analysis and Calorimetry, Copenhagen, Denmark.

Dr. O. Toft Sorensen, Materials Research Department, Riso National Laboratory DK-4000, Roskilde, Denmark.

Tel.: +45 4677 5800

Fax: +45 4677 5758

E-mail: o.toft.sorensen@risoe.dk

Biotechnology

3–8 September 2000

11th International Biotechnology Symposium, Berlin, Germany.

Prof. G. Kreysa, DECHEMA e.V.— c/o 11th IBS, Theodor-Heuss-Allee 25, 60486 Frankfurt/Main, Germany.

Tel.: +49 69 7564 235 / -249

Fax: +49 69 7564 176 / -304

E-mail:

biotechnology2000@dechema.de

Nuclear and Radiochemistry

3–8 September 2000

5th International Conference on Nuclear and Radiochemistry (NRC5), Pontresina, Switzerland.

Prof. H. W. Gäggeler, Chairman, Mrs. R. Lorenzen, Secretary, Paul Scherrer Institut, CH-5232 Villigen-Ost, Switzerland.

Tel.: +41 56 310 2401

Fax: +41 56 310 4435

E-mail: ruth.lorenzen@psi.ch

Analytical Chemistry

3–9 September 2000

EUROANALYSIS XI, Lisboa, Portugal.

Prof. Maria Filomena Camões, Chair, Dr. Cristina Oliveira, Secretary, Departamento de Química e Bioquímica, Faculdade

de Ciências, Universidade de Lisboa, Edifício C1-5º Piso, P-1700 Lisboa, Portugal.

Tel.: +351 1 3906138

Fax: +351 1 3909352; 7500088

E-mail: euroanalysisxi@fc.ul.pt

Natural Products

4–8 September 2000

22nd International Symposium on the Chemistry of Natural Products, Sao Paulo, Brazil.

Dr. M. Fátima das G.F. da Silva, Universidade Federal de Sao Carlos, Depto. de Química, Via Washington Luiz, km 235, CP676, Sao Carlos, Sao Paulo, Brazil.

Tel.: +55 16 274 8208

Fax: +55 16 274 8350

E-mail: dmfs@power.ufscar.br

Medicinal Chemistry

18–22 September 2000

XVI International Symposium on Medicinal Chemistry, Bologna, Italy.

Prof. C. Melchiorre, Università di Bologna, Dipartimento di Scienze Farmaceutiche, Via Belmeloro 6, I-40126 Bologna, Italy.

Tel.: +39 051 259 706

Fax: +39 051 259 734

E-mail: camelch@alma.unibo.it

Trace Elements in Food

9–11 October 2000

Warsaw, Poland.

Prof. B. Szeke, Chairman, Dr. R. Jedrzejczak, Secretary, Institute of Agricultural and Food Biotechnology

ul. Rakowiecka 36

02-532 Warsaw, Poland.

Tel.: +48 22 606 3876

Fax: +48 22 4904 28

E-mail: jedrzejczak@ibprs.waw.pl

Food Packaging

8–10 November 2000

2nd International Symposium on Food Packaging—Ensuring the Safety and Quality Food, Vienna, Austria.

Dr. L. Contor, ILSI Europe, 83,

Avenue E. Mounier, Box 6, B-1200, Brussels, Belgium.
Tel.: +32 (2) 771 0014
Fax: +32 (2) 762 0044
E-mail: laura@ilsieurope.be

Polymers

20–24 November 2000
7th Latin-American Symposium on Polymers (SLAP'2000) and 5th Ibero American Congress on Polymers, Havana, Cuba.
Dr. Ricardo Martínez, Dr. Waldo Argüelles-Monal, IMRE, Universidad de La Habana La Habana 10400, Cuba.
Fax: +53 7 33 42 47
E-mail: slap@imre.oc.uh.cu

2001

Chemistry and Chemical Engineering

16–20 April 2001
IV International Congress on Chemistry and XIII Caribbean Conference on Chemistry and Chemical Engineering, Havana, Cuba.
Prof. Alberto J. Nunez Selles, Sociedad Cubana de Química, Ave 21 & 200, Atabey, Apdo. 16042, CP 11600, Havana, Cuba.
Tel.: +537 218 178
Fax: +537 336 471
E-mail: cqf@infomed.sld.cu

CHEMRAWN XIV

9–13 June 2001
Chemrawn Conference—Toward Environmentally Benign Processes and Products, Boulder, Colorado, USA.
Dr. Dennis L. Hjerresen, Environmental Management Program, Los Alamos National Laboratory - Mail Stop J591, Los Alamos, NM 87545.
Tel.: +1 505 665 7251
Fax: +1 505 665 8118
E-mail: dennish@lanl.gov

IUPAC 41st General Assembly

29 June–8 July 2001
Brisbane, Australia.
IUPAC Secretariat.
Tel.: +1 919 485 8700
Fax: +1 919 485 8706
E-mail: secretariat@iupac.org

IUPAC 38th Congress / World Chemistry Congress 2001

1–5 July 2001
Brisbane, Australia.
Congress Secretariat, P.O. Box 177, Red Hill Q 4054, Australia.
Tel.: +61 7 3368 2644
Fax: +61 7 3369 3731
E-mail: wcc2001@ccm.com.au

Phosphorus Chemistry

29 July–3 August 2001
15th International Conference on Phosphorus Chemistry, Sendai, Japan.
Prof. Masaaki Yoshifuji, Department of Chemistry, Graduate School of Science, Tohoku University, Aoba, Sendai 980-8578, Japan.
Tel.: +81 22 217 6558
Fax: +81 22 217 6562
E-mail: yoshifuji@mail.cc.tohoku.ac.jp

Analytical Sciences

6–10 August 2001
International Congress on Analytical Sciences 2001 (ICAS2001), Tokyo, Japan.
Prof. Tsuguo Sawada, Chairman, Department of Applied Chemistry, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan.
Tel.: +81 3 5841 7236 (or 7237)
Fax: +81 3 5841 6037
E-mail: icas2001@laser.t.u-tokyo.ac.jp

Biodiversity

3–8 November 2001
3rd IUPAC International Conference on Biodiversity (ICOB-3), Antalya, Turkey.

Prof. B. Sener, Department of Pharmacognosy, Faculty of Pharmacy, Gazi University, P.O. Box 143 06572, Maltepe-Ankara, Turkey.
Tel.: +90 312 212 2267
Fax: +90 312 213 3921
E-mail: blgsener@tr-net.net.tr

Sweeteners

13–17 November 2001
2nd International Symposium on Sweeteners, Hiroshima-Shi, Japan.
Prof. Kasuo Yamasaki, Institute of Pharmaceutical Sciences, Faculty of Medicine, Hiroshima University Kasumi, Minami-ku, Hiroshima 734-8551, Japan.
Tel.: +81 82 257 5285
Fax: +81 82 257 5289
E-mail: yamasaki@pharm.hiroshima-u.ac.jp

Visas

It is a condition of sponsorship that organizers of meetings under the auspices of IUPAC, in considering the locations of such meetings, should take all possible steps to ensure the freedom of all bona fide chemists from throughout the world to attend irrespective of race, religion, or political philosophy. IUPAC sponsorship implies that entry visas will be granted to all bona fide chemists provided application is made not less than three months in advance. If a visa is not granted one month before the meeting, the IUPAC Secretariat should be notified without delay by the applicant.

Chemistry International

2000, Vol. 22, No. 2 (March)

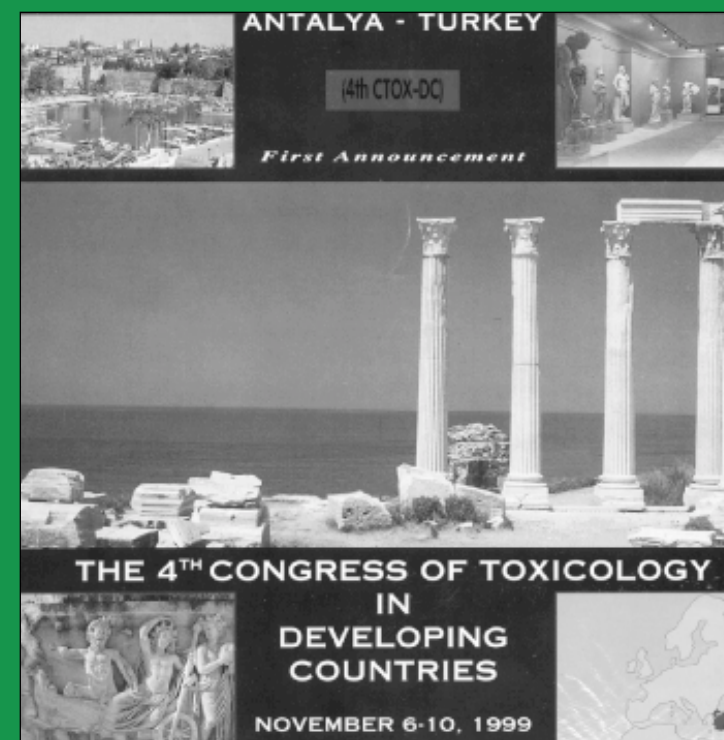


- 33 **News from IUPAC**
- 36 **News and Notices from Other Societies and Unions**
- 36 The West African Chemical Society: A Catalyst for the Development of African Science
- 40 **Reports from IUPAC-Sponsored Symposia**
- 43 **Awards and Prizes**
- 44 **New Books and Publications**
- 53 **Reports from Commissions**
- 59 **Conference Announcements**
- 61 **Conference Calendar**

ISSN 0193-6484

Chemistry International

**The news magazine of the International Union of
Pure and Applied Chemistry (IUPAC)**



2000, Vol. 22, No. 2 (March)

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

PUBLICATIONS MANAGER: Alan J. Senzel
PRODUCTION EDITOR: Cheryl Wurzbacher

All correspondence to be addressed to The Editor, *Chemistry International* (CI), IUPAC Secretariat, P. O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Telephone: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: edit.ci@iupac.org and <http://www.iupac.org/publications/ci/>

Subscriptions

Six issues of *Chemistry International* (ISSN 0193-6484) will be published bimonthly in 2000 (one volume per annum) in January, March, May, July, September, and November. The 2000 subscription rate is USD 99.00 for organizations and USD 45.00 for individuals. Subscription orders may be placed directly with the IUPAC Secretariat. Affiliate Members receive *CI* as part of their Membership subscription, and Members of IUPAC bodies receive *CI* free of charge.

Reproduction of Articles

Unless there is a footnote to the contrary, reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original in *Chemistry International*.

Periodicals postage paid at Durham, NC 27709-9998 and additional mailing offices. POSTMASTER: Send address changes to *Chemistry International*, IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757.

Front cover: Brochure cover for the 4th IUTOX Congress of Toxicology in Developing Countries (4th CTOX-DC), held 6–10 November 1999, in Antalya, Turkey. See page 42.

Printed by: Cadmus Journal Services, Easton, MD, USA

International Union of Pure and Applied Chemistry

International Union of Pure and Applied Chemistry (IUPAC)



President: A. HAYES (UK)
Vice President: P. S. STEYN (South Africa)
Past President: J. JORTNER (Israel)

Secretary General: E. D. BECKER (USA)
Treasurer: C. BUXTORF (Switzerland)

IUPAC Secretariat

P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Tel.: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: secretariat@iupac.org and <http://www.iupac.org>

The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary non-governmental, nonprofit association of organizations, each of which represents the chemists of a member country. Its objectives are as follows:

- to promote continuing cooperation among the chemists of the member countries
- to study topics of international importance to pure and applied chemistry which need standardization or codification
- to cooperate with other international organizations that deal with topics of a chemical nature
- to contribute to the advancement and understanding of pure and applied chemistry in all its aspects

The membership of IUPAC currently comprises 45 national organizations.

National Adhering Organizations

Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Österreichische Akademie der Wissenschaften (**Austria**)
Nationaal Comité voor Scheikunde/Comité National de Chimie (**Belgium**)
Brazilian Chemistry Committee for IUPAC (**Brazil**)
Bulgarian Academy of Sciences (**Bulgaria**)
National Research Council of Canada (**Canada**)
Sociedad Chilena de Química (**Chile**)
Chinese Chemical Society, Beijing (**China**)
Chemical Society located in Taipei (**China**)
Croatian Chemical Society (**Croatia**)
Czech National Committee for Chemistry (**Czech Republic**)
Det Kongelige Danske Videnskabernes Selskab (**Denmark**)
Academy of Scientific Research and Technology (**Egypt**)
Suomen Kemian Seura (**Finland**)
Comité National Français de la Chimie (**France**)
Deutscher Zentrallausschuss für Chemie (**Germany**)
Association of Greek Chemists (**Greece**)
Hungarian Academy of Sciences (**Hungary**)
Indian National Science Academy (**India**)
Royal Irish Academy (**Ireland**)
Israel Academy of Sciences and Humanities (**Israel**)
Consiglio Nazionale delle Ricerche (**Italy**)

Science Council of Japan (**Japan**)
Korean Chemical Society (**Korea**)
Kuwait Chemical Society (**Kuwait**)
Koninklijke Nederlandse Chemische Vereniging (**Netherlands**)
Royal Society of New Zealand (**New Zealand**)
Norsk Kjemisk Selskap (**Norway**)
Chemical Society of Pakistan (**Pakistan**)
Polska Akademia Nauk (**Poland**)
Sociedade Portuguesa de Química (**Portugal**)
Colegio de Químicos de Puerto Rico (**Puerto Rico**)
Russian Academy of Sciences (**Russia**)
King Abdulaziz City for Science and Technology (**Saudi Arabia**)
Slovak Chemical Society (**Slovakia**)
Slovenian Chemical Society (**Slovenia**)
National Research Foundation (**South Africa**)
Consejo Superior de Investigaciones Científicas (**Spain**)
Svenska Nationalkommittén för Kemi (**Sweden**)
Neue Schweizerische Chemische Gesellschaft (**Switzerland**)
Türkiye Kimya Dernegi (**Turkey**)
Royal Society of Chemistry (**United Kingdom**)
National Research Council, National Academy of Sciences (**USA**)
Union of Yugoslav Chemical Societies (**Yugoslavia**)

News from IUPAC

IUPAC Secretary General Dr. Edwin D. Becker has provided the following three news items of general interest to IUPAC Members and readers of *Chemistry International*:

At the General Assembly in Berlin, the IUPAC Bureau authorized the formation of ad hoc committees to examine the Union's programs in three important areas: Relations with Industry, Education, and Chemical Nomenclature. On behalf of the IUPAC Officers, I would like to summarize the current status of these efforts.

IUPAC-Industry Relations

Dr. Alan Hayes (then President Elect) was given responsibility for organizing this committee. The charge to the Committee is as follows:

- to consider options and then recommend a course of action by which IUPAC could become more attractive to increased participation by scientists in industry,
- to recommend alternative mechanisms by which IUPAC should liaise and interact with industry, including consideration of sensible processes within IUPAC itself, and
- to review the activities and composition of COCI and how it should participate in the outcomes of the two points above.

Committee Membership

Alan Hayes	President, IUPAC (Chairman)
Edwin D. Becker	Secretary General, IUPAC
David Evans	R&D Director, Zeneca Agrochemicals
René-Paul Martin	Past Chairman, COCI
Junshi Miyamoto	Sumitomo Chemicals (Past President, Division VI)
Edwin Przybylowicz	Chairman, IUPAC Finance Committee
Jurgen Reden	European Federation of Pharmaceutical Industries
Luzius Senti	Member, COCI
Rob Taalman	European Chemical Industry Council (CEFIC)
Nelson Wright	Chairman, COCI
John Jost	Executive Director, IUPAC

The Committee held an introductory meeting on 12 November 1999. A number of aspects of current and potential relationships between IUPAC and the chemical industry were discussed. Particular attention was

given to the Long Range Research Initiative of the International Council of Chemical Organizations (ICCA), which is being managed by CEFIC in Europe, the Chemical Manufacturers Association in the USA, and the Japan Chemical Industry Association. This is a global, generic, human and environmental research program aimed at filling gaps in chemical effects research for compounds of commercial interest.

Education Strategy Development Committee (ESDC)

Prof. Joshua Jortner (then IUPAC President) assumed responsibility for organizing this effort and was able to recruit as Chairman of the ESDC Prof. Peter W. Atkins, who is internationally known in the field of chemical education. The charge to the ESDC follows:

One of the Union's long-range goals states: "IUPAC will utilize its global perspective to contribute toward the enhancement of education in chemistry and to advance the public understanding of chemistry and the scientific method." The ad hoc ESDC has been established by the Bureau to provide advice on the ways by which IUPAC should work toward this goal. The ESDC is charged to:

- review IUPAC's current and immediately planned activities in the field of chemical education, including programs of the Committee on Teaching of Chemistry, the other Operational Committees, and the scientific Divisions;
- recommend areas in which IUPAC should and realistically can make meaningful contributions to worldwide chemical education; provide advice as to areas in which IUPAC should not be involved;
- recommend ways by which IUPAC can realistically contribute to the public understanding of chemistry and the scientific method;
- recommend any organizational and/or operational changes within IUPAC to facilitate the implementation of the programs proposed by the Committee; and
- report to the Bureau by 31 August 2000—preferably a final report if feasible, or an interim report otherwise with a final report to follow.

Committee Membership

Peter W. Atkins (Chairman)	UK
Berhanu Abegaz	Botswana
D. Balasubramanian	India
John Bradley	South Africa
Norman Craig	USA

Antonio Monge-Vega	Spain
Julio de Paula	USA/Brazil
Judith Poë	Canada
Kip Powell	New Zealand
Leiv Sydnes	Norway
Natalia Tarasova	Russia
Fabienne Meyers	IUPAC Secretariat

This committee held its first meeting on 20–21 February 2000.

Chemical Nomenclature

Dr. Edwin D. Becker (Secretary General) was given responsibility for initiating a study of IUPAC's programs in the nomenclature of chemicals—organic, inorganic, macromolecular, and biochemical—and developing recommendations for future activities. He decided (with the concurrence of the other IUPAC officers) that the first step should be a broad-based meeting to explore the wide ramifications of the subject. He recruited Dr. Alan McNaught (member of IDCNS and CPEP) to lead this effort. A roundtable discussion on "Representations of Molecular Structure: Nomenclature and its Alternatives" has been organized for Washington, DC on 10–11 March 2000 to bring together nomenclature experts with representatives of various groups that are current or potential users of IUPAC chemical nomenclature (e.g., editors, publishers, database providers, patent and international trade authorities) and individuals from major commercial nomenclature services. This group of about 35 participants from 12 countries is to help define long-range needs and to provide recommendations for future directions for IUPAC work in the field.

Comments and suggestions in these three areas are, of course, welcome. The Executive Committee will monitor progress, and reports will be presented in due course to the Bureau.

Report on IOCD/IUPAC Workshop on Environmental Analytical Chemistry for Regulatory Chemists and Laboratory Managers, Prague, Czech Republic, 16–18 June 1999

Dr. Walter R. Benson (Benson and Associates, 6209 Crathie Lane, Bethesda, MD 20816-1003, USA; E-mail: Wbenson270@aol.com), Chairman of the IUPAC Chemistry and the Environment Division's Joint Working Party with IOCD on Environmental Analytical Chemistry in Developing Countries, has submitted the following report:

The Joint IOCD/IUPAC Working Party on Environmental Analytical Chemistry (JWP) was formed by the

International Organization for Chemical Sciences in Development (IOCD) and IUPAC in 1993 out of a realization that developing countries need scientists and technical personnel with internationally acceptable expertise and laboratories to perform environmental monitoring. These countries struggle with global trade restrictions, standards, and environmental laws on monitoring of pollutants in air, food, water, and solid wastes, but face a severe lack of trained personnel to manage these tasks.

The JWP held this workshop in Prague with the aim of providing updated information on environmental analytical chemistry to analytical chemists and laboratory managers in the Central European countries that participate in official environmental monitoring. In organizing the workshop, the JWP cooperated with the Czech Chemical Society, Deputy Minister Karel Blaha of the Department of Environmental Affairs of the Czech Republic, and Charles University. A local organizing committee consisted of Dr. Pavel Draser, Vice President of the Czech Chemical Society; Profs. Jiri Barek and Karel Stulik of Charles University; and Dr. Frantiska Pavlikova of Merck & Co. of Prague. This committee shared with the JWP the responsibility for inviting participants and speakers from Central Europe. The committee made contact with various chemical societies in Central Europe, while IOCD and IUPAC placed announcements about the workshop on their respective web sites.

Working together, Dr. Draser and Prof. Barek greatly facilitated the success of the workshop by selecting participants; choosing the workshop site at Pruhonice in the midst of a group of hotels and a park; arranging for various workshop services, including use of ten computer workstations and audiovisual equipment; and selecting the caterer and meal menus. They also scheduled a concert by a Czech musical ensemble as a special treat for the workshop attendees.

The JWP was responsible for selecting the topics and appropriate lecturers for presentation of the workshop. Topics selected fell within the following areas:

- sampling procedures used in air, water, food, and soil
- sample preparation procedures
- international methods of analysis used to regulate air, water, food, and soil
- managing a chemical laboratory and proficiency testing of chemists
- using computer networks to locate necessary chemical information and experts

The workshop lecturers, 15 scientists in all, came from the Czech Republic (4); Slovakia (1); Belgium (1); and the United States (9). A total of 36 participants came from the Czech Republic, Latvia, Lithuania, Romania, Slovakia, Ukraine, and the United States; 12 of

these scientists received travel grants from UNESCO. The lecturers made use of handouts and videos. One-half of one day during the workshop was devoted to practical training on computers, using AOAC, EMMI, and other materials. In addition, graduate students from Charles University prepared and exhibited posters in a special session devoted to practical training. Each Central European country represented at the workshop was provided a copy of a CD-ROM from AOAC International containing the text of the March 1999 edition of *AOAC International Official Methods of Analysis*.

From 13–15 June 1999, just before the IOCD/IUPAC workshop, the American Chemical Society (ACS) held a Central Europe–United States Workshop on Environmental Chemistry at the same site in Prague. IOCD gratefully acknowledges the assistance afforded to the IOCD/IUPAC workshop by the ACS in agreeing to share some of the lecturers.

Financial and “in kind” support of the workshop was provided by UNESCO, IUPAC, AOAC International, Huels AG of Germany, the Belgian government, several agencies of the U.S. government (EPA, FDA, and NSF), the U.S. National Academy of Sciences, and Merck and SciTech of Prague.

A full report of the workshop, listing the names of all lecturers and participants along with the full program and specific topics, can be obtained by writing to Dr. Walter R. Benson, c/o IOCD (U.S. office), P.O. Box 8156, Falls Church, VA 22041, USA. The next workshop is planned to take place in Africa on official analyses of pollution samples resulting mainly from mining. Contact the IOCD/IUPAC JWP members (see the IUPAC web site at www.iupac.org) for information or to contribute input on subjects, speakers, and funding.

Report on the EURACHEM 10th Anniversary Meeting and the EURACHEM Full Committee Meeting, Helsinki, Finland, 16–19 June 1999

Dr. A. Fajgelj (Quality Assurance Supervisor, International Atomic Energy Agency Laboratories, A-2444 Seibersdorf, Austria; E-mail: A.Fajgelj@iaea.org), Chairman of the IUPAC Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories, has submitted the following report:

As a member of the EURACHEM Committee and as the IUPAC liaison person, I attended the annual meeting of EURACHEM. This year, EURACHEM celebrates the 10th anniversary of its founding, and a one-day conference was organized on this occasion. I gave an invited oral presentation on “Current and future programs of IUPAC”.

A network of organizations in Europe, EURACHEM was established in 1989 to provide a system for the international traceability of chemical measurements and to promote good quality assurance practices. It provides a forum for the discussion of common problems and for developing an informed and considered approach to both technical and policy issues. EURACHEM today comprises 18 full members (European and European Free Trade Association [EFTA] countries) and 10 associate members. There are also 11 observer or liaison organizations (AOAC International, Cooperation on International Traceability in Analytical Chemistry [CITAC], EUROLAB, Association of European Institutes for Metrology [EUROMET], Consultative Committee on Amount of Substance [CCQM], European Accreditation [EA], International Laboratory Accreditation Cooperation [ILAC], IUPAC, etc.). The goals of EURACHEM are to:

- promote best practices and develop networks for collaboration,
- develop international comparability of chemical measurements,
- provide a framework for cooperation in establishing traceability,
- establish national EURACHEM groups and provide input to other international organizations, and
- raise awareness among decision makers and develop broad-based education and training.

Most of the work of EURACHEM is carried out by Working Groups (WGs). At the moment, there are four active WGs: Education and Training, Measurement Uncertainty, Reference Materials, and Proficiency Testing. The WGs mainly organize workshops and produce guides. The following guides have been published by EURACHEM alone or in cooperation with other organizations:

- *Accreditation for Chemical Laboratories, Guidance on the Interpretation of the EN 45000 Series of Standards and ISO/IEC Guide 25*, EURACHEM/WELAC Guide (1993)
- *Accreditation for Laboratories Performing Microbiological Testing*, EURACHEM (1996)
- *Quantifying Uncertainty in Analytical Measurement*, EURACHEM Guide (1995)
- *Quality Assurance for Research and Development and Nonroutine Analysis*, EURACHEM/CITAC Guide (1998)
- *The Fitness for Purpose of Analytical Methods, A Laboratory Guide to Method Validation and Related Topics*, EURACHEM (1998).

These guides have gained a large international acceptance and are also followed in the countries that are not official members of EURACHEM.

EURACHEM's program includes workshops on traceability (Bratislava, 1999), QA and computers (Berlin, 1999), reference materials (Berlin, 2000), proficiency testing (Boras, 2000), and sampling (Delft, 2001). The most important work regarding the EURACHEM guides will be the revision of the guide *Accreditation for Chemical Laboratories, Guidance on the Interpretation of the EN 45000 Series of Standards and ISO/IEC Guide 25* (1993), which should reflect the changes of the ISO Guide 25 that is now being transferred to the ISO 17025 Standard.

In the last three years, a strong cooperation between IUPAC's Interdivisional Working Party on Harmoni-

zation of Quality Assurance Schemes for Analytical Laboratories and EURACHEM has been established. As a result, IUPAC's recently published Harmonized Guidelines for the Use of Recovery Information in Analytical Measurement (*Pure Appl. Chem.*, Vol. 71, No. 2, pp. 337–348, 1999) have been endorsed by EURACHEM. Future cooperation was also foreseen at the Workshop on Principles and Practices of Method Validation held in November 1999 in Budapest, Hungary, where EURACHEM was also formally represented.

News and Notices from Other Societies and Unions

The West African Chemical Society: A Catalyst for the Development of African Science

This article, by Prof. Richard-Emmanuel Eastes (Département de chimie, Ecole Normale Supérieure, 24, rue Lhomond, 75005 Paris, France; E-mail: reeastes@voila.fr) and Jean-Paul Pradère (Director of Research at CNRS Laboratoire de Chimie Organique, UMR 6513 au CNRS, Faculté des Sciences et des Techniques, 2, rue de la Houssinière, 44322 Nantes cedex 3, France; E-mail: Jean-Paul.Pradere@chimie.univ-nantes.fr), was originally published in *L'Actualité Chimique* in January 1999 (pp. 30–33) and is reprinted here with their kind cooperation and permission.

Summary

The West African Chemical Society (Société Ouest-Africaine de Chimie [S.O.A.CHIM.]) was established in 1994 by a group of scientists from nine West African countries (Benin, Burkina Faso, Guinea Conakry, Ivory Coast, Mali, Mauritania, Niger, Senegal, and Togo). The aim of the society is to develop chemical sciences in West Africa, both from an educational and research point of view. To this end, the society uses four means of communicating information: seminars, a monthly information bulletin, the *Journal de la Société Ouest-Africaine de Chimie* (published twice a year), and the annual S.O.A.CHIM. Congress, the last two of which took place in Cotonou (Benin) in 1998 and Niamey (Niger) in 1999.

This article offers a report of the congress that took place in Cotonou in August 1998, and attempts to establish the situation regarding chemical sciences in sub-Saharan West Africa. Furthermore, this article stresses how important it is for African universities to forge links with Western laboratories.

Introduction

From 3–7 August 1998, the West African Chemical Society (S.O.A.CHIM.) held its 4th Annual Congress in Cotonou, Benin. Several university department heads and directors of institutes from different African countries took part in this international scientific conference. It also appeared an effort had been made by national delegates to make it financially possible for doctoral students to participate in this conference. Among the hundreds of scientists present at the congress, some of the French-speaking conferees had been invited to shed a different and complementary light on the chosen theme for that year: "Chemistry and Quality of Life". They endeavored to present the results of work that may be used immediately by the African chemistry community, both for research and teaching purposes.

This article, which briefly introduces the S.O.A.CHIM. and its various activities, gives a report of the congress in Cotonou and offers a rapid assessment of research and teaching in sub-Saharan West Africa.

Founding of the West African Chemical Society

The West African Chemical Society was established in Ouagadougou (Burkina Faso) in 1994 by about 100 chemistry, biochemistry, and biology researchers and teacher-researchers from French-speaking universities in the West African cities of Abidjan (Ivory Coast), Bamako (Mali), Conakry (Guinea Conakry), Cotonou (Benin), Dakar (Senegal), Lomé (Togo), Niamey (Niger), Nouakchott (Mauritania), and Ouagadougou (Burkina Faso).

Aims and Objectives of the S.O.A.CHIM.

The S.O.A.CHIM., which is at the heart of a genuine and innovative "southern" attempt at cooperation, aims to unite chemists from West Africa, creating within the group a synergy for the development of chemical sci-

ences. The main objectives of the S.O.A.CHIM. are as follows:

- to contribute to the development of all aspects of chemical sciences;
- to be an information center, a meeting forum, and a place of exchange for its members;
- to ensure the dissemination of results obtained in African research laboratories;
- to consider ways of improving teaching and scientific research despite frequent lack of resources;
- to propose and support any industrial, economic, and professional prospects relating to chemical sciences; and
- to represent the individuals concerned and their disciplines before the public authorities of the different states and before regional, international, and nongovernmental organizations.

Therefore, the S.O.A.CHIM. represents an important attempt at cultural and economic development, as well as a genuine tool for the integration of African chemists into the international community.

Activities of the S.O.A.CHIM.

The S.O.A.CHIM. is organized into divisions according to the main areas of chemical sciences and into more specific subject areas, such as inorganic chemistry, theoretical chemistry, spectroscopy, natural substances, etc. The initiatives of the S.O.A.CHIM. are mainly intended to encourage collaboration on subjects that concern problems with the development of the member countries, including the following:

- extraction and promotion of local natural substances;
- study of methods for limiting and controlling air and water pollution;
- chemistry of agricultural inputs (fertilizers, pesticides, etc.);
- promotion of inorganic raw materials, and geological and mining research;
- chemical and biochemical methods of controlling the quality of foodstuffs; and
- chemistry of pharmaceutical products, etc.

These initiatives are centered around four main areas of exchange:

- workshops, conferences, and seminars;
- S.O.A.CHIM. information bulletin;
- *Journal de la Société Ouest-Africaine de Chimie*, referenced in *Chemical Abstracts*; and
- annual congresses.

Annual Congress of the S.O.A.CHIM.

This event is a veritable scientific congress that enables scientists to expound upon the results of their research.

It is also the ideal occasion for them to discuss their theses and expand their knowledge. This event owes its development to the dynamism of each nation and to the determination shown by the committee members (Chairman: Prof. Y. T. N'Guessan, Ivory Coast; Vice Chairmen: Prof. L. Diop, Senegal, and Prof. C. G. Accrombessi, Benin; and Permanent Secretary: Prof. F. S. Sib, Burkina Faso) to increase international interest. After congresses in Abidjan in 1995, Dakar in 1996, and Lomé in 1997, it was Cotonou's turn in 1998 to welcome about 130 participants, who came not only from the nine West African countries involved in the S.O.A.CHIM., but also from South Africa, Canada, France, and Rwanda.

Sequence of Events at the 4th S.O.A.CHIM. Congress

Presentations at the 4th S.O.A.CHIM. Congress portrayed various research activities developed in West African universities. A large part of the results concerned the promotion of natural products (extraction of essential oils, highlighting active principles linked with African pharmacopoeia, etc.).

In addition to 43 presentations on the congress theme of "Chemistry and Quality of Life", 5 plenary sessions that took place in the large lecture hall in the Faculty of Health Sciences at the University of Cotonou dealt with the following areas:

- New nucleoside analogues: a heterochemical application; Dr. J.-P. Pradère, Faculty of Science and Technical Studies, University of Nantes, France; Part 1: HIV, replication modes, biomolecules, synthesis of nonnucleosidic derivatives; Part 2: Synthesis and activity of 2,3-dideoxynucleosidic derivatives.
- Microscale chemistry in experimental chemistry; R.-E. Eastes, Ecole Normale Supérieure, Paris, France; Part 1: Definition, pedagogical interests, and prospects in Africa; Part 2: Practical demonstrations.
- Chemical pollution: a multidimensional approach to water contamination caused by agricultural activities; Prof. O. Banton, INRS Eau, University of Quebec, Canada.
- Urban pollution: modeling emissions of pollutants in the city of Cotonou; Prof. A. L. Ajavon, University of Benin, Lomé, Togo.

Assessment of the Congress in Cotonou

The Cotonou Congress provided an occasion for productive debates and exchanges between participants. The most successful aspect of the congress was clearly the fact that researchers from several countries working on similar topics were able to meet and discuss their results and opinions. Apart from S.O.A.CHIM. congresses, this kind of exchange is only possible through

articles published in the semiannual *Journal de la Société Ouest-Africaine de Chimie*, which is unable to cover all the work carried out in that part of the world.

Finally, over a period of five days, ceremonial and personal interactions took place in an extraordinarily friendly and enthusiastic atmosphere. Without a doubt, this fervor will be present once again at the 6th Congress in Conakry (Guinea Conakry) in 2000.

Aspects of Chemical Sciences in Sub-Saharan West Africa

The few days spent in the company of the African scientists and the accounts they gave, as well as the experience of cooperation between laboratories and/or universities—illustrated by the particularly active collaboration developed between the University of Abidjan and the University of Nantes¹—enabled us to gain considerable insight into the strengths and weaknesses of the chemical sciences in West Africa. We portray below a brief outline of those details.

Research

It appears that research development differs according to the countries concerned. More disadvantaged countries owe their slow progress to several diverse difficulties relating to low budgets for equipment and operating costs, problems with the supply of chemicals, difficulties with equipment maintenance, etc. Furthermore, many universities do not have the means for analyses that are crucial to the completion of a research project. These shortcomings have direct consequences on the length of time necessary to obtain results at a postgraduate work-experience level and at a doctoral thesis level, and, therefore, on the very nature of the subject matter that it is possible to develop.

When acquiring any research equipment, the decision is also linked to problems involving its maintenance. Prof. C. G. Tea, Dean of the Department of Science of Matter Structure and Technology at the University of Abidjan-Cocody, insists that one should adopt the following strategy: "Before any decision is made concerning the acquisition of equipment, priority should be given to the question of maintenance. Indeed, technical constraints such as power failures and important variations in voltage require the protection of our equipment. These measures regarding equipment protection apply as much to our microcomputers as they do to NMR appliances, if we have them. Furthermore, climatic conditions (humidity and/or heat) should not be overlooked".

The difficulties involved in accessing scientific information should be emphasized. Indeed, many laboratories do not have the financial support to subscribe to the various scientific magazines. Hence, there is a clear need to cooperate with foreign laboratories that have the means to develop the required projects.

Teaching

Despite the lack of resources and teaching staff, African universities welcome a large number of students. As a result, teaching costs prove to be quite high in the field of chemistry—particularly in the cases of Cocody and Abobo-Adjamé Universities in Abidjan (Ivory Coast). Even though teachers at African universities have often been trained in French-speaking countries, most of them are now African, having practically replaced the French teachers that were previously working in the universities in question. In addition, a number of teacher exchanges and teaching partnerships exist between African universities.

With regard to syllabus content, there is a clear tendency to try to incorporate teaching directed toward professional development into master's level university programs. However, although essential to the learning of chemistry at all levels, experimental teaching often remains difficult to implement.

Therefore, bearing in mind the many difficulties that workshop supervisors encounter in certain departments, microscale chemistry² could be a concept worth developing. Indeed, low budgets, irregular supplies of solvents, lack of available equipment, and the large numbers of students to monitor occasionally force workshop supervisors to organize several pairs around one experiment. This problem is repeated regularly for years, owing to lack of chemicals and equipment. Microtechniques using small amounts of products, along with the ingenious ideas that underlie them, seem to be well adapted to these circumstances. Indeed, by reducing the costs, the risks, the time spent to implement experiments, and the amounts of chemicals necessary for each synthesis, microscale chemistry is likely to enable more students to carry out experiments by themselves. Another form of microscale chemistry—different from that which is currently being developed in France—already exists and is now widespread with successful results in southern Africa. As far as West Africa is concerned, projects are already underway to develop experiments using small quantities of simple materials (magnesium synthesis, for example). As part of this initiative, we are also organizing a collection of lightweight materials (syringes, septa, small glass items, various test tubes, spatulas, etc.) and chemicals in small packaging so that they can be sent to several African university laboratories. Every day in our laboratories, we throw away many items too worn to be used for research purposes, but which could still be of great use in the teaching of chemistry.³

External Collaborations

It appears that, unlike the teaching situation, few research projects between Africans in the field of chemistry are currently being developed. On the other hand, a number of French laboratories are collaborating with

their African counterparts. This collaboration, which is sometimes crucial to the survival of research in certain laboratories, can take on different aspects at various levels.

Therefore, the welcoming of African students on a grant into French universities, after having been chosen by written application and recommended by the scientific heads of their own universities, ensures the development of new training and/or the reinforcement of the cooperative action in progress. In the recent past, the work of certain doctoral students has even enabled them to become prize winners for their doctoral theses (awarded by the National Center for Scientific Research [C.N.R.S.]).

Furthermore, the development of integrated research programs, which includes the active participation of African teacher-researchers as part of the program of teacher training, enables expansion of one's knowledge. These initiatives are all the more useful, because teacher-researchers often have heavy teaching loads.

However, during the completion of a cooperative project, the individuals in charge strongly urge that as much of the research program as possible be carried out in the African laboratory. This program may then be continued by the doctoral students (as work-based learning), the researcher, or the African teacher-researcher in the European laboratory involved in the cooperation, which has the necessary techniques and equipment for its development. A third partner, either from academia or from industry, may carry out the tests or measures to promote the developed subject, if necessary. These kinds of strategies are currently being formulated in order to develop new material, such as in the synthesis of biomolecules, the promotion of natural products, etc.

Cooperative programs may also involve laboratories from a number of African and French universities. For example, highlighting the active principles of plants in traditional African medicine (odontology) is the focus of a joint venture between Abidjan-Cocody University and Nantes University. As part of the program, the Faculties of Science and Technology and of Odontology and Pharmacy at the two universities are combining their expertise to complete this project. Moreover, several universities may find themselves working together on the same program.

In general, the needs that have previously been identified regarding teaching, research, and scientific information highlight the real need that these joint ventures represent for our African colleagues. Therefore, as part of this initiative, the chairman of the S.O.A.CHIM. visited France in the spring of 1999 in order to meet the different partners likely to offer their support and the various heads of the Société Française de Chimie (SFC).

Conclusion

Even though it is still young, the S.O.A.CHIM. represents Africa's determination to provide itself with the necessary means for self-development. Therefore, the effort its members put forth to increase interest can only create a feeling of optimism and confidence. Thanks to initiatives of this kind, perhaps one day the following quotation, which appeared at the rear of the conference hall at the University of Cotonou, will become obsolete: "Every child that does not have access to education is the proof that our civilization does not yet live up to human dignity." (E. Portella, a leading dignitary of UNESCO).

Chemists eager to pass on to their African colleagues subjects likely to be of some interest to them, have the opportunity to publish the information in the *Journal de la Société Ouest-Africaine de Chimie*⁴, or they may participate in any future congresses⁵.

Notes

¹Coordinators: Prof. Y. T. N'Guessan and Dr. J.-P. Pradère.

²For more information about microscale chemistry, see: a) Martin, N. H. and Waldman, F. S. The three R's of resource management in the undergraduate organic chemistry laboratory. *J. Chem. Ed.*, Vol. 71, November 1994, No. 11, pp. 970–971; b) Szafran, Z., Singh, M. M., and Pike, R. M. The microscale inorganic laboratory: Safety, economy, and versatility. *J. Chem. Ed.*, Vol. 66, November 1989, No. 11, pp. A263–A267; c) Perlmutter, H. D. and Kapichak, R. K. A multiscale approach to organic chemistry laboratory introduction of kiloscale experiments. *J. Chem. Ed.*, Vol. 69, June, 1992, No. 6, pp. 507–508; d) Silberman, R. G. Running a microscale organic chemistry lab with limited resources. *J. Chem. Ed.*, Vol. 71, June 1994, No. 6, pp. A140–A141; e) Zipp, A. P. Introduction to "the microscale laboratory". *J. Chem. Ed.*, Vol. 66, November 1989, No. 11, pp. 956–957; f) Wood, C. G. Microchemistry. *J. Chem. Ed.*, Vol. 67, July 1990, No. 7, pp. 596–597; and g) Zubrick, J. W. *The Organic Chem Lab Survival Manual: A Student's Guide to Techniques*, 3rd ed. John Wiley, New York, 1992.

³Before sending any items, contact R.-E. Eastes at the following e-mail address: eastes@junie.ens.fr

⁴For information about publishing in the *Journal de la Société ouest-africaine de chimie*, contact: Professeur Faustin Sié SIB, 06 BP 9006 Ouagadougou 06–Burkina-Faso.

⁵To participate in the S.O.A.CHIM. Congress, contact: Professeur Yao Thomas, N'Guessan Laboratoire de Chimie Organique Structurale, Faculté des Sciences et des Techniques, Université d'Abidjan-Cocody, 22 BP 582 Abidjan 22, République de Côte d'Ivoire.

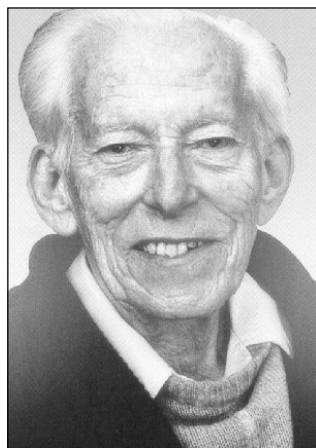
Reports from IUPAC-Sponsored Symposia

39th Microsymposium, Advances in Polymerization Methods: Controlled Synthesis of Functionalized Polymers, 12–15 July 1999, Prague, Czech Republic

This symposium was chaired by Dr. Petr Vlček and organized by the Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, one of the most prestigious research institutions in Europe and the organizer of a series of IUPAC microsymposia and discussion conferences within a program called “Prague Meetings on Macromolecules”. On average, two microsymposia and one discussion conference per year are organized.

The Institute of Macromolecular Chemistry in Prague, with its former directors, the late Prof. Otto Wichterle and long-time IUPAC member Prof. Pavel Kratochvíl, is now headed by a new director from a younger generation, Dr. Karel Ulbrich. The directors and their staff organize these meetings to deal with problems related to the research carried out at the Institute. Meetings are attended by distinguished scientists from all over the world. Virtually all leading researchers in macromolecular science have attended at least one—or more often several—of these meetings. The research program of the Institute is sufficiently diversified to encompass the major contemporary topics of these symposia.

Institute Director Ulbrich opened the symposium with his presentation, and Prof. Stanisław Penczek, Official IUPAC Representative, gave a congratulatory speech on behalf of Prof. Joshua Jortner, President of IUPAC, and Prof. Robert Gilbert, President of the Macromolecular Division of IUPAC.



Prof. Otto Wichterle, former Director of Institute of Macromolecular Chemistry.

The symposium attracted 127 active participants from 29 countries, including 25 from the Czech Republic. There were 9 main lectures, 23 special lectures, and 61 posters.



Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, located in Prague.

Main lectures were presented on both radical and ionic polymerization, as follows:

- K. Matyjaszewski (United States). “Atom transfer radical polymerization as a route to polymers with controlled architecture, compositions, and functionality”.
- M. Sawamoto and M. Kamigaito (Japan). “Controlled synthesis of functionalized polymers by transition metal-mediated living radical polymerization”.
- Y. Yagci (Turkey). “Photoinitiating systems and their use in polymer synthesis”.
- R. P. Quirk (United States). “Anionic synthesis of functionalized polymers using functionalized initiators and electrophilic termination reactions”.
- N. Hadjichristidis (Greece). “Synthesis and characterization of model 4-sulfozwitterionic polymers of variable architecture”.
- A. Hirao (Japan). “Anionic living polymerizations of functional monomers. Precise synthesis of various polystyrenes with monosaccharide residues by means of anionic living polymerization and living functionalization reaction”.
- S. Penczek and A. Duda (Poland). “Polymerization of cyclic esters on covalent metal alkoxides and carboxylates. Importance for polymer synthesis”.
- A. H. E. Müller (Germany). “New well-defined polymer structures *via* living polymerizations”.
- P. J. Lutz (France). “Control of macromolecular architectures *via* various polymerization processes: Advantage and drawback”.

Although any choice of the other lectures would be strictly personal, I should note that interest is focused on radical polymerization allowing several kinetic and



Castle Hradčany in Prague, Czech Republic.

structural features of resulting polymers to be controlled. Thus, mostly nitroxy-mediated polymerization and atom transfer radical polymerization (ATRP) were discussed. These forms of polymerization are not as demanding from the experimental viewpoint as ionic processes, and it was shown that they may lead to graft, block, multiblock, star, and functionalized macromolecules from several classes of monomers. In these processes, termination by macroradical coupling or disproportionation cannot be avoided, but macromolecules of medium molar masses (e.g., up to 10^4 and sometimes higher) can be prepared with well-controlled molar masses and end-groups. By “controlled”, it is understood that, e.g., almost 100% of the end-groups have the desired structure. Control of molar masses means that within a certain range of molar masses, one can obtain a desired and planned molar mass.

The main lectures were given by well-seasoned scientists, although the younger rising stars, such as Profs. Müller, Lutz, and Matyjaszewski, were also present.

In special lectures, both ionic and radical techniques were exposed. Polymers with special properties, further developments in heteromultistar polymers, water-soluble polymers, and molecular recognition in template polymerization were considered the most interesting directions for research.

In addition to the scientific program, the organizers provided social events and a program for accompanying persons that included sightseeing in Prague and a guided tour of the Old Town with a walk over famous gothic Charles Bridge, a visit to the Prague Castle Hradčany, and dinner at the house where Mozart wrote *Don Giovanni*.

All of us have been convinced that we participated not only in a first-class scientific meeting, but also spent

a few happy days in the most beautiful town of Central Europe.

Professor Stanislaw Penczek

Titular Member, Macromolecular Division (IV) Committee

Associate Member, Commission on Macromolecular Nomenclature (IV.1)

Łódź, Poland

**8th International Symposium on
Macromolecule–Metal Complexes
(MMC-8), 5–8 September 1999,
Tokyo, Japan**

This symposium was the eighth meeting in the series of symposia on Macromolecule–Metal Complexes (MMC) that have been held every two years, in turn, in Asia, America, and Europe. MMC-8 was attended by 219 participants from 19 countries, including 63 participants from overseas. It was organized by Waseda University and the Division of Macromolecular Complexes of the Japanese Society of Polymer Science.

MMC-8 was intended to provide a forum for exhibitions and discussion about the most recent progress on the bases and developments of macromolecule–metal complexes related to supramolecular assembly, multi-electron transfer reactions, and wide-ranging technologies such as secondary batteries, fuel cells, photoenergy conversion, sensors, catalysis, and micro-electronics. The opening ceremony, held in Ibuka Memorial Hall of the International Conference Center, Waseda University, Tokyo, was quite impressive. There were 8 plenary lectures, 33 invited and oral presenta-

tions, 97 posters, and a priority session on batteries and portable fuel cells. Poster sessions and lectures were all well attended, discussions were lively, and the symposium achieved a great success. Outstanding speakers included J.-H. Fuhrhop, Free University of Berlin; K. Levon, Polytechnic University of Brooklyn; D. Wohrle, University of Bremen; N. Oyama, Tokyo University of Agriculture and Technology; F. Ciardelli, University of Pisa; G. A. Sykes, University of Newcastle; and J. Reedijk, Leiden University.

A welcoming reception, a short excursion to Asakusa (a tofu restaurant), including a night view of Tokyo, and the symposium banquet were all well organized, and participants enjoyed them very much.

Symposium President Prof. Eishun Tsuchida, Program Committee Chairman Prof. Masao Kaneko, and Executive Committee Chairman Prof. Hiroyuki Nishide are to be commended for presenting a symposium of the highest quality in terms of topics, speakers, and organization.

Professor Kazuyuki Horie
Titular Member, Commission on Macromolecular Nomenclature (IV.1)
University of Tokyo
Tokyo, Japan

4th IUTOX Congress of Toxicology in Developing Countries (4th CTOX-DC), 6–10 November 1999, Antalya, Turkey

This meeting, sponsored by the Turkish Society of Toxicology along with IUPAC and the International Union of Toxicology (IUTOX), covered a wide variety of topics at a high level and was attended by many of the world's leading toxicologists. It started with a workshop on environmental oestrogens that provided an overview of the problem and stimulated active discussion. The conclusion of the workshop was that the evidence for significant harmful effects of oestrogenic substances in the natural environment is still limited to a few examples and that no definite conclusions can yet be reached about any effect on the human species. Current research in this area will, we hope, clarify matters and alleviate public concern.

The workshop was followed by a series of symposia. Topics included safety issues in developing countries, life styles and health, pesticides, neurotoxicity of drugs of abuse, advances in understanding allergic sensitization, occupational exposure to chemicals in the workplace, risk assessment and chemical management, advances in molecular toxicology, and ecotoxicology. There were plenary lecture sessions on genetic polymorphism, xenobiotic toxicity, and clinical toxicology.

In addition, there were two more workshops on chemical risk assessment in theory and practice and educational needs for developing countries, as well as oral and poster presentations.

So many issues were raised and discussed that one can pick out only a few of special note. A recurring theme was the lack of facilities for local experts to monitor chemical exposures in developing countries. This situation makes it very difficult to enforce legislation for chemical safety, and it may be a particular problem with pesticides made by local manufacturers in developing countries. These pesticides are bought by farmers because they are cheap, but they may contain harmful impurities that are no longer permitted in the developed countries.

Underlying many of the presentations was concern about risk assessment. Toxicology defines the intrinsic hazard associated with a chemical and relates this hazard to exposure in the form of dose-response and concentration-response curves. However, it tells us nothing about risk, which is a function of the way in which a chemical is used and the probability of a person or other organism being exposed to a sufficient amount of a chemical to cause harm. Thus, a certain chemical may be classified as toxic, but this does not mean that it will necessarily cause harm. If little or no exposure to this chemical occurs, or is likely to occur, risk of harm may be negligible. Determining exposure is a challenge for chemists and may require development of new techniques. For example, guidelines for exposure to elements other than carbon are largely set in relation to total elemental concentration. Chemical speciation is ignored at least partly because analytical chemists often do not speciate elemental analysis. For example, arsenic analysis is rarely quoted as arsenite, arsenate, or organic species, although we know that their toxicology is different. Risk assessment based on total arsenic analysis is meaningless.

Other unifying concerns were related to differential susceptibility to the effects of chemicals owing to genetic and environmental differences and the problem of assessing mixed exposures. The effects of diet were given due attention. Ecotoxicology got less attention than it deserves, and the organizers of the next congress of this kind may wish to include more on this area.

The workshop on educational needs for developing countries was particularly interesting. It is clear that at least some developing countries are not short of expertise but, rather, lack the facilities to make full use of the experts available. It also appears that there is a lack of expertise in certain specialist areas and that the international organizations should identify these areas in order to help provide necessary course material. However, there seems to be a lack of coordination between

international bodies in providing such material and in maintaining an ongoing educational program. Perhaps IUPAC and IUTOX could get together with the International Union of Pharmacology (IUPHAR) and initiate a body for coordinating toxicological education at the international level. Such a body could ensure that educational material of recognized quality was available, preferably through the Internet, and could respond to requests for specific courses to be organized.

Nearly 300 people participated in the 4th CTOX-

DC, and it succeeded well in reflecting both our current understanding of important areas of toxicology and the significance of toxicology for safe use of chemicals in both developed and developing countries.

Dr. John H. Duffus

Chairman, IUPAC Commission on Toxicology (VII.C.2)

**The Edinburgh Centre for Toxicology
Edinburgh EH9 2JD, Scotland, United Kingdom**

Awards and Prizes

Guy Ourisson Wins Maison de la Chimie Foundation Prize

Prof. Guy Ourisson, Membre de l'Institut, Président de l'Académie des Sciences, and former IUPAC Secretary General from 1975–1983, has won the Maison de la Chimie Foundation Prize for 2000. This prestigious award, created in 1986, is intended to honor an original work in chemistry of benefit to mankind, society, or nature. This year's award has a value of 150 000 FF. A jury of three former laureates and six scientists whose nationality is other than French chose Prof. Ourisson as the prize winner by majority vote. Prof. Ourisson presented a lecture on his work entitled "Une piste pour les années 2000: vers l'origine de la vie?" at the award ceremony on 18 January 2000 at the Maison de la Chimie in Paris.

Upendra Pandit Receives "Honoris Causa" from University of Milan

Prof. Upendra Pandit, Instituut voor Moleculaire Chemie, Faculteit Der Scheikunde, Universiteit van Amsterdam and President of IUPAC's Division of Organic Chemistry (III) (now Division of Organic and Biomolecular Chemistry) from 1992–1999, has been awarded a prestigious honorary doctorate degree, the "Honoris Causa" in pharmacy, by the University of Milan. Prof. Giorgio Cignarella of the Facoltà di Farmacia, Università degli Studi di Milano presented the award to Prof. Pandit at a ceremony at the university campus in Milan on 25 January 2000.

Ram Lamba Wins American Chemical Society Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring

Prof. Ram S. Lamba, a National Representative from Puerto Rico on IUPAC's Committee on Teaching of Chemistry (CTC), is one of ten 1999 winners of an American Chemical Society Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. The award honors those who have guided a significant number of students over a sustained period of time. Particular consideration is given in the award selection process to mentors who have encouraged minorities, women, and people with disabilities to embark upon careers in scientific, engineering, and other technical fields.

A professor of chemistry and dean of academic affairs at the University of Puerto Rico at Cayey, Prof. Lamba's "mentees" have included nine university science professors and more than 500 science teachers.

New Books and Publications

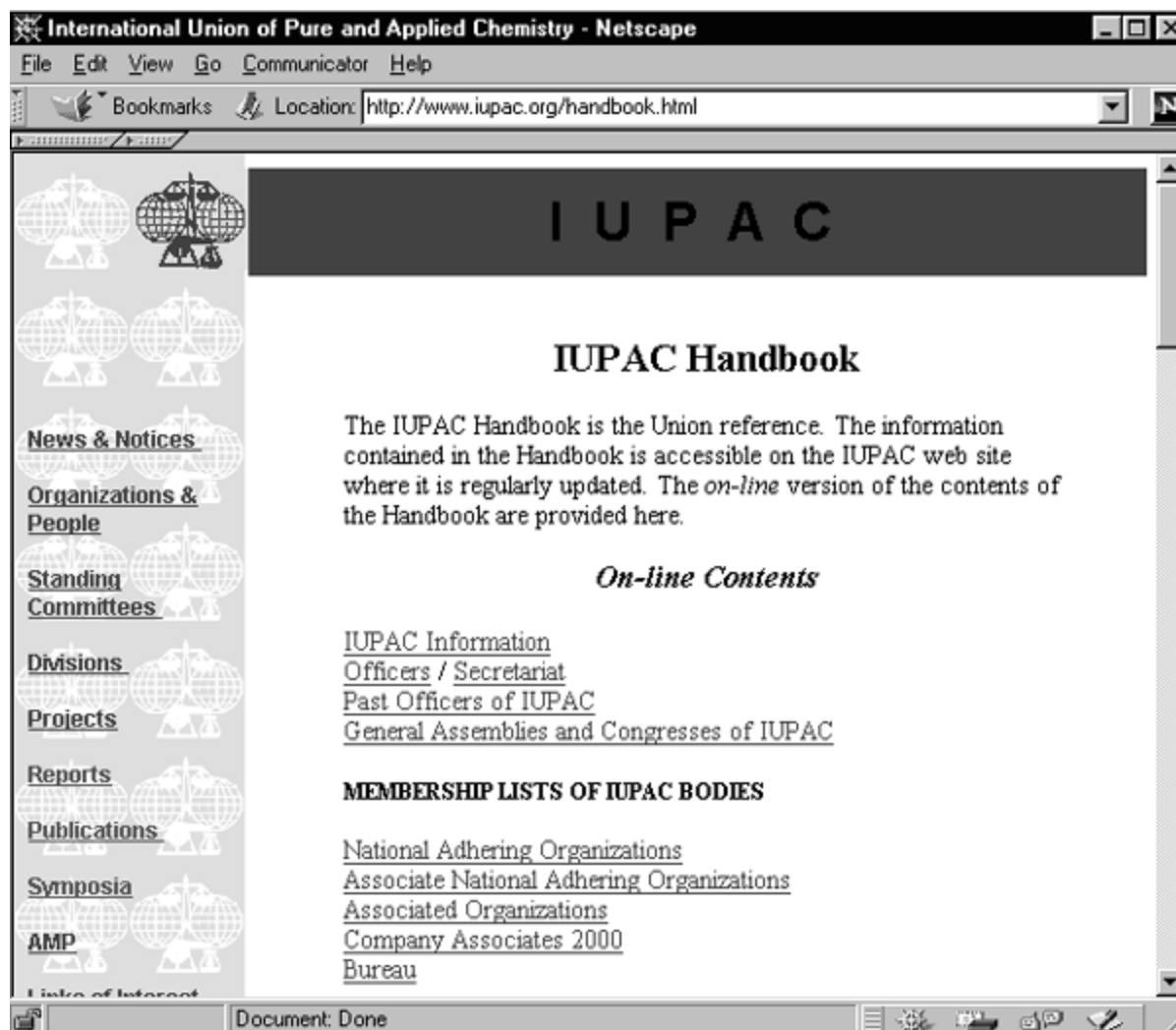
New Books from IUPAC

***IUPAC Handbook 2000–2001*. IUPAC (2000), pp. viii + 1–315. ISBN 0-9678550-0-4, USD 25.00.**

The new edition of the IUPAC Handbook, available for sale now from the Secretariat and also posted on the IUPAC web site at www.iupac.org, contains updated listings and information on all aspects of IUPAC's organization.

Included in the new Handbook are current listings of organization and membership for all IUPAC Divisions, Commissions, Committees, Working Parties, and Task Groups. Recently revised lists of IUPAC National Adhering Organizations, Associate National Adhering

Organizations, Associated Organizations, and Company Associates are presented. Historical information on past IUPAC Officers, General Assemblies, and Congresses also appears. Appendixes present information on IUPAC reports published during 1998 and 1999, IUPAC-sponsored symposia and conferences from 1998–2001, procedures for publication of IUPAC technical reports and recommendations, guidelines for drafting IUPAC technical reports and recommendations, and IUPAC copyright policies. Updated IUPAC statutes and bylaws, information about the IUPAC Affiliate Membership Program (AMP), a revised list of IUPAC-approved abbreviations, and updated coding for IUPAC bodies also are provided.



Compendium de terminologie chimique. Recommandations IUPAC et Lexique anglais/français, 2^e édition. Préparé par Jean-Claude Richer. Editions Tec & Doc, Paris (1999), pp. viii + 1-646. ISBN 2-7430-0356-1. [French translation of IUPAC "Gold Book", Compendium of Chemical Terminology, 2nd edition. Compiled by Alan D. McNaught and Andrew Wilkinson. Blackwell Science (1997), pp. vii + 1-450]

This French translation of the 2nd edition of the IUPAC "Gold Book" was prepared by Prof. Jean-Claude Richer, Department of Chemistry, University of Montreal, Quebec, Canada. It is available from Editions Tec & Doc, 11 rue Lavoisier, F-75384 Paris Cedex 08, France.

The 2nd edition of the IUPAC "Gold Book" represents a very substantial enhancement of the 1st edition. In the twelve years since publication of the 1st edition, IUPAC has revised and updated most of the original definitions, and has produced new glossaries of terms in many areas of chemistry not previously covered. Around 7 000 entries cover all the traditional areas of chemistry and also growing fields such as stereochemistry, photochemistry, organic class names, atmospheric chemistry, catalysis, biotechnology, chromatography, toxicology, and bioanalytical chemistry. The resulting compendium, like the 1st edition, contains only definitions approved by international consensus, and thus can be regarded as truly authoritative. It is an essential reference resource for chemists everywhere.

New Publication from the Pan American Health Organization

Biodiversity, Biotechnology, and Sustainable Development in Health and Agriculture: Emerging Connections

1998, 248 pages (English; also available in Spanish), ISBN 92-75-11560-5, USD 32.00 (Special offer: USD 22.00); In developing countries: USD 24.00 (Special offer: USD 17.00), Order Code SP 560. PAHO Sales and Distribution Center, P.O. Box 27, Annapolis Junction, MD 20701-0027, USA; E-mail: paho@pmds.com; Tel.: +1 301 617 7806; Fax: +1 301 206 9789; Web site: <http://publications.paho.org/>.

This publication is a compendium of articles prepared by economists, sociologists, lawyers, biological sciences researchers, and other health professionals that explores the connections among biodiversity, biotechnology, and sustainable development in developing countries from the points of view of their different professions. The book focuses on two aspects of special interest to human health: drug discovery and improved nutrition through advances in agriculture.

The first section discusses different bioprospecting ventures—including the now famous agreement between Merck & Co. and Costa Rica's National Institute for Biodiversity (INBio)—and suggests policy options for potential host countries. Subsequent sections explore such issues as costs, scientific and resource requirements, and economic prospects of different drug development models; how biodiversity and biotechnology can team up to establish a high-yield, sustainable agriculture; the legal ramifications of intellectual property rights, fair compensation for indigenous knowledge, and different contractual arrangements; how to assess biodiversity's economic value; and domestic and international policy implications of the use and conservation of biodiversity. A final section discusses whether biodiversity—"green gold"—will, in fact, become Latin America's and the Caribbean's new competitive advantage.

Emerging Connections is a must-read for those setting national biodiversity policies; teams working on the national strategies and action plans needed to implement the Biodiversity Conference; environmentalists; scientists and business people entertaining bioprospecting ventures; lawyers; and nongovernmental organization (NGOs) working on health, sustainable development, or environmental issues.

New Publications from the World Health Organization

Copper, Environmental Health Criteria No. 200

1998, xxii + 360 pages (English with summaries in French and Spanish), ISBN 92-4-157200-0, CHF 72.-/USD 64.80; In developing countries: CHF 50.40, Order No. 1160200. WHO Distribution and Sales, CH-1211 Geneva 27, Switzerland; E-mail: Publications@who.ch; Tel.: +41 22 791 24 76; Fax: +41 22 791 48 57.

This book evaluates the risks to human health and the environment posed by exposure to copper, a malleable metal found naturally in a wide variety of mineral salts and organic compounds, and in the metallic form. Copper is an essential element for all biota. It is widely used in cooking utensils and water distribution systems, in fertilizers, bactericides, fungicides, algicides, and antifouling paints, and in animal feed additives and growth promoters. Industrial applications include use as an activator in froth flotation and sulfide ores, in the production of wood preservatives, in electroplating, and in the manufacturing of azo-dyes.

The report opens with a description of the array of sampling techniques, preparation, and analytical methods available for quantifying copper in environmental and biological samples. Section 2 covers sources of

human and environmental exposure. Natural sources include windblown dust, volcanoes, decaying vegetation, forest fires, and sea spray. Anthropogenic emissions arise from smelters, iron foundries, power stations, and combustion sources such as municipal incinerators.

A section on environmental behavior discusses what is known about the fate of copper released to the atmosphere, water, and land. Data indicate that most copper is released to land; major sources are mining operations, agriculture, solid waste, and sludge from treatment works. Bioaccumulation, which occurs if the copper is biologically available, can lead to exceptionally high body burdens in animals and terrestrial plants. A review of levels detected in different environmental compartments supports the conclusion that, for healthy members of the general population, the major route of exposure is oral, with substantial exposure possible when drinking-water is contaminated with copper.

A section on kinetics and metabolism cites evidence that copper is mainly absorbed through the gastrointestinal tract, where part is excreted through the feces and the remainder is transported to the liver bound to serum albumin. The liver is the critical organ of copper homeostasis. When copper exceeds homeostatic control, its biological toxicity arises from its effects on the structure and function of biomolecules such as DNA, membranes, and proteins.

A review of abundant findings from studies in laboratory animals and *in vitro* test systems shows wide species variations in toxic effects. Rats exposed to single doses by the oral route showed alterations in blood biochemistry and hematology, and adverse effects on the liver, kidney, and lungs. Long-term exposure in rats and mice demonstrated no overt signs of toxicity other than a dose-related reduction in growth. Studies of chronic toxicity and carcinogenicity were judged inadequate for assessment. Limited data on immunotoxicity suggest some impairment of humoral and cell-mediated immune functions in mice. While studies of neurotoxicity have failed to demonstrate behavioral effects, some neurochemical changes have been reported after oral administration.

An assessment of health effects in humans draws on numerous investigations of copper's role as both an essential and a toxic element, and on abundant evidence that adverse effects may arise from both deficient and excessive intakes. Clinically evident deficiency, which is rare in the general population, is characterized by anemia, neutropenia, and bone abnormalities. Copper toxicity, likewise rare in the general population, usually arises following the consumption of contaminated beverages, including drinking-water, or from accidental or suicidal ingestion of high quantities of copper salts. Symptoms include vomiting, lethargy, acute

hemolytic anemia, renal and liver damage, neurotoxicity, and increased blood pressure and respiratory rates.

The evaluation gives particular attention to the clinical features of population groups known to be especially sensitive to copper toxicity. These people include premature infants fed on cow's milk, infants recovering from severe malnutrition, hemodialysis patients, patients suffering from chronic liver disease, and patients with genetically determined disorders of copper homeostasis, such as Menkes disease, Wilson disease, and hereditary aceruloplasminemia. The report also cites evidence from several recent dietary surveys indicating suboptimal copper intake in the mean population. Health effects arising from insufficient copper intake, which may have a role in the pathogenesis of cardiovascular disease, were judged to be more important than adverse effects associated with excessive ingestion.

Polybrominated Dibenzo-p-dioxins and Dibenzofurans, Environmental Health Criteria No. 205

1998, xxi + 303 pages (English with summaries in French and Spanish), ISBN 92-4-157205-1, CHF 66.-/USD 59.40; In developing countries: CHF 46.20, Order No. 1160205.

This book evaluates the risks to human health and the environment posed by exposure to polybrominated dibenzo-*p*-dioxins (PBDDs) and polybrominated dibenzofurans (PBDFs). Of no commercial use, these compounds are generated as unwanted by-products of various industrial and combustion processes and have been detected as contaminants in a number of brominated organic chemicals, many of which are used as flame retardants.

Thermolysis of brominated flame retardants is an important source of emissions, as is the incineration of products containing these flame retardants, most notably scrap computers and business machines. PBDDs and PBDFs have also been detected in emissions of motors using both leaded petrol and unleaded petrol, with and without catalytic converters, and in emissions of diesel engines.

In view of the complexity of these compounds, the problems with analytical procedures, and substantial gaps in the experimental database, the report makes a special effort to determine the extent to which the environmental behavior and toxic effects of PBDDs and PBDFs resemble those of their better characterized chlorinated analogs, polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). An effort is also made to determine the extent to which PBDDs and PBDFs contribute to the overall hazard posed by environmental "dioxins".

The opening sections consider currently available

analytical methods for detection and analysis, and discuss the principal sources of human and environmental exposure. Although data are limited, the available evidence confirms formation of PBDDs and PBDFs during fire accidents, especially when electrical appliances are involved, during the use of flame retardants and fire extinguishers, during waste disposal and treatment, and during combustion processes in engines. Current environmental levels are judged to be much lower than those for the ubiquitous PCDDs and PCDFs. Evidence suggests that occupational exposure may occur in a variety of workplaces. Workers at greatest risk are those employed in the plastic and recycling industry, where brominated flame retardants or products containing them are used; fire fighters; and cleanup personnel associated with fires. Some monitoring results are also available for exposures in workplaces equipped with a number of electrical appliances continually in use, such as displays and computer monitors.

A section on environmental behavior cites evidence that these compounds are similar to their chlorinated analogs, with preferential distribution to carbon- or fat-rich compartments and long persistence. Data on kinetics and metabolism are assessed in the next section, which concludes that these compounds are distributed throughout the body, with major deposits found in liver and adipose tissue, followed by skin and muscle.

Data from experimental studies of toxicity support the conclusion that the thymus, lymphatic tissue, and liver are the principal targets of toxic action. Thymus atrophy and other signs of immunotoxicity were the effects most consistently seen in laboratory animals. Data on human exposures and health effects were judged inadequate to support an assessment of hazards for the general population or a recommended safe level of exposure.

In view of the growing worldwide production and use of brominated flame retardants as additives to a series of polymers, the report concludes that the amount of bromine-containing waste will be increasing in the future, and that electronic scrap from casings and printed circuit boards of computers, flame-retarded with brominated compounds, will reach the waste streams as a potentially major source of release to the environment. As the potential for toxic action of these compounds is judged similar to that of their chlorinated analogs, the report recommends that every effort should be made to prevent environmental pollution with PBDDs and PBDFs. To avoid release in the environment, the report further concludes that brominated flame retardants should be phased out and that all products flame-retarded with bromine compounds should be labeled and disposed of only in properly constituted waste incinerators designed to minimize emissions.

Carbon Tetrachloride, Environmental Health Criteria No. 208

1999, xviii + 177 pages (English with summaries in French and Spanish), ISBN 92-4-157208-6, CHF 42.-/USD 37.80; In developing countries: CHF 29.40, Order No. 1160208.

This book evaluates the risks to human health and the environment posed by exposure to carbon tetrachloride, a volatile liquid previously used in the production of chlorofluorocarbons and other chlorinated hydrocarbons. Production and use have declined considerably following the Montreal Protocol on Substances that Deplete the Ozone Layer. Additional former applications that have also been phased out include use as a grain fumigant, pesticide, vent for oils and fats, metal degreaser, fire extinguisher, and flame retardant.

A review of data on the environmental behavior of this volatile chemical concludes that almost all carbon tetrachloride released to the environment is ultimately present in the atmosphere. Although estimates of atmospheric lifetime vary considerably, 45–50 years is accepted as the most reasonable range. Studies indicate significant global transportation and ubiquitous presence in air. The main degradation site is the stratosphere, where the chemical is photolytically degraded by ultraviolet radiation. Abundant evidence indicates that carbon tetrachloride contributes to both global warming and ozone depletion.

Concerning sources of exposure, studies of concentrations detected in a wide range of indoor and outdoor samples indicate that the general population can be exposed to carbon tetrachloride via air, food, and drinking-water. A review of studies of kinetics and metabolism in laboratory animals and humans cites evidence that carbon tetrachloride is well absorbed from the gastrointestinal and respiratory tracts and distributed throughout the body, with the highest concentrations detected in the liver, brain, kidney, muscle, fat, and blood.

A review of toxicity studies conducted in laboratory mammals and *in vitro* test systems indicates that the liver and kidney are the principal targets of toxic action. The severity of these toxic effects depends on a number of factors, including diet. Studies show that other compounds, including ethanol, can potentiate the hepatotoxicity of carbon tetrachloride. Long-term toxicity studies were judged inadequate to assess the chemical's carcinogenic potential. Carbon tetrachloride produced moderate irritation following skin application in animals.

An assessment of health effects in humans draws on findings from studies in human volunteers and case reports of accidental and suicidal poisoning. These findings confirm toxic effects on the liver and kidney. Acute

symptoms of exposure include nausea, vomiting, headache, dizziness, dyspnea, and death. Liver damage appears after 24 hours or more, while kidney damage becomes evident only 2 to 3 weeks following acute exposure. Studies indicate that hepatic and renal damage can arise from long-term exposure to low concentrations. Available epidemiological studies have failed to establish an association between exposure to carbon tetrachloride and increased risk of mortality, neoplasia, or liver disease.

On the basis of this review, the report established a tolerable daily intake for carbon tetrachloride of 1.42 $\mu\text{g}/\text{kg}$ body weight, and a tolerable daily concentration in air of 6.1 $\mu\text{g}/\text{m}^3$.

Flame Retardants: Tris(chloropropyl) Phosphate and Tris(2-chloroethyl) Phosphate, Environmental Health Criteria No. 209

1998, xix + 106 pages (English with summaries in French and Spanish), ISBN 92-4-157209-4, CHF 27.-/USD 24.30; In developing countries: CHF 18.90, Order No. 1160209.

This book evaluates the risks to human health and the environment posed by exposure to three flame retardants: tris(1-chloro-2-propyl) phosphate (TCPP), tris(1,3-dichloro-2-propyl) phosphate (TDCPP), and tris(2-chloroethyl) phosphate (TCEP). In view of their many similarities, TCPP and TDCPP are covered together. Data on all flame retardants are extremely limited and largely confined to studies of environmental levels and adverse effects detected in experimental animals and *in vitro* test systems.

The monograph on TCPP and TDCPP describes manufacturing processes and summarizes current uses. The vast majority of TCPP is used in rigid polyurethane foams, with main applications in insulation for buildings and in refrigerator casings. TDCPP is likewise added as a flame retardant to polyurethane foam and has some additional applications as a flame retardant for nonwoven fabrics. For both chemicals, studies show that residues are found infrequently and at low concentrations in food items. For TCPP, traces have been detected in industrial and domestic effluents, but not in surface water or drinking-water. Traces of TDCPP been detected in sewage effluent, river water, seawater, drinking-water, water sediment, and fish. In view of the low volatility of both chemicals, the report concludes that human exposure from these sources will be very low and will not present an acute health hazard for the general population. Likewise, no adverse effects on the environment are anticipated from the use of either of these flame retardants.

Experimental studies of TCPP in laboratory animals demonstrate low to moderate toxicity by the oral, dermal, and inhalation routes. Tests indicate that the chemical is neither a skin nor an eye irritant. No studies were

available to evaluate reproductive toxicity, immunotoxicity, or carcinogenic potential. *In vitro* and *in vivo* mutagenicity studies produced negative results.

Toxicity studies of TDCPP show low to moderate acute toxicity by the oral route and low acute toxicity by the dermal route. The report found no evidence of teratogenicity or mutagenicity. A single carcinogenicity study found an increased occurrence of several tumors at all exposure levels tested in both male and female rats. In the absence of data on the mechanisms of carcinogenic action, the relevance of these findings to humans could not be assessed. The limited studies of occupationally exposed workers were judged inadequate for evaluation.

The second monograph evaluates TCEP, a flame retardant with declining uses in the production of liquid polyester resins and in textile back-coating formulations. Traces have been detected in river water, seawater, drinking-water, sediment, fish and shellfish, and in a few food items. Experimental studies show low to moderate acute oral toxicity. In repeat dose experiments, TCEP caused adverse effects on the brain, liver, and kidneys. The report concludes that TCEP is not an irritant to the eye or skin and is not teratogenic, although some adverse effects on the fertility of male rats and mice have been demonstrated. Data indicating low environmental exposures support the conclusion that TCEP poses a very low risk of adverse health effects for the general population. Use of TCEP is not expected to cause any adverse effects on the environment.

Food Safety Issues Associated with Products from Aquaculture, Report of a Joint FAO/NACA/WHO Study Group, Technical Report Series No. 883

1999, vii + 55 pages (available in English; French and Spanish in preparation), ISBN 92-4-120883-X, CHF 14.-/USD 12.60; In developing countries: CHF 9.80, Order No. 1100883.

This report provides an expert assessment of risks to human health that may arise from the consumption of farmed finfish and crustaceans. Representing the consensus reached by a group of 28 international authorities, the report responds to the urgent need for a complete inventory of all potential risks, an evaluation of their significance and severity, and advice on their reduction or control. The assessment takes on particular significance in view of the growing importance of farmed fish as both a major export commodity and a vital source of protein in low-income food-deficit countries.

Produced by WHO in collaboration with FAO and the Network of Aquaculture Centers in Asia-Pacific, the report gives particular attention to practices com-

mon in Asia, where 90% of global aquaculture production takes place. Common fish farming practices, associated risks, and strategies for their control are considered for small-scale rural subsistence farms, as well as for intensive commercial systems.

The report opens with a review of the significance of aquaculture as one of the fastest growing food sectors in the world and an increasingly important source of sustainable food production. A section on global aquaculture production and food supply describes various systems used in fish farming, outlines current trends, and discusses the significance of production in Asia, where aquaculture supplies both low-value staple-food species for domestic markets and high-value cash-crop species for export. The principles of food safety risk analysis are introduced in the next section, which explains how risk analysis functions to identify food safety hazards and determine their relevance for health. The use of risk analysis in the development of food standards to protect health and facilitate trade is also briefly explained.

Against this background, the core of the report provides a complete assessment of all potential biological and chemical hazards. Biological hazards are presented in the categories of parasites, bacteria, and viruses. For parasites, major attention is given to the risk posed by trematode parasites, especially in areas where the consumption of raw fish is common. An evaluation of hazards associated with human pathogenic bacteria considers bacteria naturally present in the aquatic environment and those present as a result of contamination with human or animal feces, giving particular attention to hazards associated with *Salmonella* spp., *Escherichia coli*, and other enterobacteria. For viruses, the report notes that finfish and crustaceans are not usually associated with the spread of viral foodborne disease. Potential hazards from toxic compounds produced by aquatic organisms are also briefly assessed.

The assessment of chemical hazards considers compounds used in the aquaculture system itself or introduced by acute and chronic pollution of waterways or water sources. Separate evaluations are provided for a large number of agrochemicals, chemotherapeutics, metals, feed ingredients, additives, contaminants, and organic pollutants. Because the risk of infectious disease is an ever-present problem in aquaculture, the evaluation gives particular attention to potential health effects arising from the use of antimicrobial agents, the presence of residues in edible fish tissue, and the possible development of antimicrobial resistance.

Strategies for controlling biological and chemical hazards are presented in the next section, which describes the seven principles of the Hazard Analysis Critical Control Point (HACCP) system, adapted to aquaculture. To illustrate these principles, four critical con-

trol points (site selection, water quality, feed supply, and fish production) in an aquaculture system are discussed. The remaining sections point to the need for considerable further research and set out the main recommendations and conclusions reached during the assessment.

WHO Expert Committee on Specifications for Pharmaceutical Preparations, 35th Report, Technical Report Series No. 885

1999, vi + 156 pages (available in English; French and Spanish in preparation), ISBN 92-4-120885-6, CHF 35.-/USD 31.50; In developing countries: CHF 24.50, Order No. 1100885.

This book provides a progress report on a number of WHO activities intended to support a comprehensive approach to the quality assurance of pharmaceutical products. Although the report has global relevance, its guidance is of particular importance in countries attempting to establish or strengthen a regulatory framework for pharmaceutical products. All recommendations share the ultimate goal of helping regulatory authorities safeguard the health of patients by protecting them from substandard or counterfeit products.

The report has two parts. The first provides a summary of several ongoing activities coordinated by WHO. These include the continuing development of the *International Pharmacopoeia*, the establishment of International Chemical Reference Substances and International Infrared Reference Spectra, guidelines for good manufacturing practices, work on the standardization of nomenclature and terminology, and support to countries seeking to establish drug regulatory legislative systems.

The second and most extensive part consists of nine annexes. The first two provide updated lists of available International Chemical Reference Substances and International Infrared Reference Spectra. The remaining annexes set out international guidelines and recommendations covering a range of activities central to the quality control and regulation of pharmaceutical products. Revised general guidelines for the establishment, maintenance, and distribution of chemical reference substances are issued in line with recent refinements in pharmaceutical and analytical methods, and the continuing need to harmonize the use of comparative standards for pharmaceutical testing and control.

Two subsequent annexes supplement WHO guidelines for good manufacturing practices. The first provides advice on the role, functions, and training of the authorized person, within a manufacturing establishment, responsible for the release of batches of finished products for sale. The second describes good practices for the manufacture of pharmaceutical excipients. Topics covered include self-inspection and quality control,

use and cleaning of equipment, quality control of starting materials, and good practices in production and quality control. Additional guidelines cover the inspection of drug distribution channels as a means of ensuring that quality drugs reach patients, and present a framework, consisting of core activities, goals, and areas where national standards are needed, for promoting good pharmacy practices in community and hospital pharmacy settings.

Additional guidelines on national drug regulatory legislation establish guiding principles for small drug regulatory authorities. General advice on points to consider when drafting national legislation and defining the scope of the marketing authorization procedure is followed by a detailed example of a legislative scheme, including model legislative text and commentary. Intended to assist drug regulators, those drafting legislation, and decision-makers, the guidelines should prove of immediate value to small national drug regulatory authorities with limited human and other resources. Also included is a provisional legislative scheme for the registration of pharmacy personnel. The report concludes with provisional guidelines for developing training programs for the inspection and examination of counterfeit pharmaceuticals.

Cancer Pain Relief and Palliative Care in Children

1998, ix + 76 pages (available in English; French and Spanish in preparation), ISBN 92-4-154512-7, CHF 18.-/USD 16.20; In developing countries: CHF 12.60, Order No. 1150459.

This book provides a comprehensive guide to the relief of pain and other symptoms in children suffering from cancer. Drawing on considerable new knowledge about pain control in children, the book aims to ensure that pediatric oncologists and other health professionals have all the information and arguments needed to relieve pain, improve quality of life, and reduce the distress of patients and their families. Recommended lines of action are specific to the unique way in which children experience pain and respond to both pain-relieving medication and non-drug measures.

Information ranges from a tabular summary of the advantages and disadvantages of different routes for administering analgesics to children, through a list of drugs that should not be used in newborns and infants, to the simple observation that older children may deny their pain for fear of more painful treatment. Advice on the management of symptoms related to the disease process or arising from its treatment is also provided in this comprehensive account.

The book opens with facts and figures indicating the global magnitude of problems related to childhood cancer and the large percentage of patients who will experience severe pain. Reasons for the widespread

inadequacy of pain control are also discussed. These reasons include exaggerated fears of drug addiction, lack of knowledge about the way children perceive pain, misunderstanding of the pharmacodynamics and pharmacokinetics of opioid analgesics in children, use of inappropriate drug doses, and failure to appreciate the value of simple non-drug supportive measures. Readers are reminded that, with commitment and the appropriate use of available technology, most of the world's childhood cancer patients can receive both pain relief and palliative care, even if cure is impossible.

Against this background, the book presents concise clinical advice in two parts. Part 1 discusses the components of palliative care, stressing the need to provide pain relief within the context of a holistic approach that recognizes children's psychological, social, and spiritual problems. A discussion of the main types of pain in childhood cancer makes a distinction between developed countries, where most pain arises from diagnostic and therapeutic procedures, and the developing world, where diagnosis is often late and most pain is therefore disease-related.

The second and most extensive part provides a detailed guide to therapeutic strategies, giving major attention to the correct prescribing of analgesic drugs. A description of the principles of pain assessment in children is followed by practical advice on the use of simple behavioral, cognitive, and supportive pain-relieving measures, many of which can be provided by parents or siblings. Because analgesic drugs are regarded as the mainstay of pain relief, subsequent sections provide precise guidelines for analgesic drug therapy, describe specific drugs and recommended doses for pain relief in different situations, and explain appropriate ways of treating the predictable side effects of opioids. A section dealing with the issue of opioid dependence and tolerance presents facts and arguments that can ease the fears of parents and help ensure that severe pain is treated with adequate doses of opioids.

Other sections explain the use of adjuvant therapy to elevate mood, reduce anxiety levels, or minimize the adverse side effects of the primary analgesic drugs, and discuss the management of pain caused by diagnostic and therapeutic procedures. In line with the call for a holistic approach to care, advice is also given on the spiritual needs of children and families, on care for the dying child, and on related ethical issues, including euthanasia and physician-assisted suicide. The guide concludes with discussions of priorities in professional education, legislative and policy issues, and requirements for the organization of cancer pain relief programs.

Compassionate as well as authoritative, the book should prove useful to all health workers engaged in the care of children with cancer.

***Environmental Health Services in Europe 4. Guidance on the Development of Educational and Training Curricula* (WHO Regional Publications, European Series No. 84) by Martin Fitzpatrick and Xavier Bonnefoy, WHO Regional Office for Europe, Copenhagen, Denmark**

1998, viii + 198 pages (available in English only), ISBN 92-890-1350-8, CHF 45.-/USD 40.50; In developing countries: CHF 31.50, Order No. 1310084.

The commitment made by the Member States of the WHO European Region to developing their environmental health services is gradually bearing fruit. The seeds of this commitment were sown over the last two decades through the European regional policy for health for all. This was followed up by the First European Conference on Environment and Health, held in Frankfurt-am-Main in 1989, which identified the groundbreaking principles underpinning environmental health in the European Charter on Environment and Health. The Second European Conference, in Helsinki in 1994, proved to be a watershed in the development of environmental health services in the Region, presenting a clear path forward that all Member States could follow through the development of national environmental health action plans (NEHAPs).

It was clear that the countries would need support in developing and implementing NEHAPs, and the Regional Office therefore developed a project to produce a series of publications dealing with all aspects of environmental health services management. The first in the series provided an overview of how services are managed throughout the Region, and the second dealt with the variety of policy options that Member States might consider in organizing those services. The third book (WHO Regional Publications, European Series, No. 82) concentrated on the staffing of environmental health services. This fourth volume, which is a companion to the third, provides practical assistance in the education and training of environment and health professionals. This assistance includes identifying relevant learning objectives, developing appropriate teaching methodologies, and proposing a range of curricula for various levels of professionals.

There was tremendous interest on the part of Member States and educational institutes in the development of this publication. The result is a book that is grounded in the realities of Member States who are endeavoring to equip their environment and health professionals to deal with the rapidly changing world in which they work. It also attempts to facilitate environment and health service providers and educational institutions in developing a common understanding of how to address the needs of these professionals.

***Safe Management of Wastes from Health Care Activities*. Edited by A. Prüss, E. Giroult, and P. Rushbrook**

1999, xiv + 230 pages + 4 color plates (available in English; French and Spanish in preparation), ISBN 92-4-154525-9, CHF 72.-/USD 64.80; In developing countries: CHF 50.40, Order No. 1150453.

This handbook provides the first comprehensive guide to the safe and efficient handling, treatment, and disposal of all categories of hazardous waste generated by health care activities. Although the major emphasis is on waste generated by hospitals, guidelines and advice are also relevant to wastes produced in health centers, research facilities, and laboratories, or associated with home care or treatment in doctors' and dentists' practices.

In publishing this handbook, WHO aims not only to promote a sound managerial approach and the use of appropriate technologies, but also to inform countries about the health risks that result from inadequate management of health care waste. With these goals in mind, the book provides both an alert to documented public health and environmental hazards and a catalog of the technical, managerial, and legislative options available for reducing these risks. All components of a waste management policy—whether at the national or institutional level—are considered in detail.

Although recommended policies and procedures have universal relevance, the handbook gives particular attention to conditions in developing countries, where methods for the safe treatment and disposal of hazardous waste may be limited. With these conditions in mind, the handbook includes approaches for gradual improvements together with a catalog of options for waste management that include both simple and highly sophisticated technologies. Throughout, photographs, line drawings, checklists, tables, and step-by-step procedures are used to enhance the practical value of the wealth of guidance provided.

The book opens with a definition and characterization of hazardous health care wastes categorized as infectious waste, pathological waste, sharps, pharmaceutical waste, genotoxic waste, chemical waste, waste with high content of heavy metals, pressurized containers, and radioactive waste. The health consequences of exposure to each category of waste are described in the next chapter, which considers the nature and severity of associated health hazards, factors influencing the likelihood of exposure, persons at risk, and significance for public health. Concentrated cultures of pathogens and contaminated sharps are identified as the waste items that represent the most acute potential hazards to health. Other chapters consider legislative, regulatory, and policy issues, and offer a step-by-step guide to the planning of waste management, including use of a de-

tailed model survey questionnaire for gathering data on waste generation and management practices in hospitals.

Against this background, five chapters offer guidance in a range of specific practices and procedures for safe waste management. Chapters cover strategies for waste minimization, recycling, and reuse; good practices in the handling, segregation, packaging, storage, and transportation of wastes; a wide range of treatment and disposal technologies appropriate for specific categories of waste; and the collection and safe disposal of hazardous wastewater. The remaining chapters discuss costs, health and safety practices for health care personnel and waste workers, the management of spillage and other emergencies, basic principles of hospital hygiene and infection control, and training needs. The final chapter sets out a minimum program of essential waste management practices considered suitable for smaller rural health care establishments and field hospitals in refugee camps and other temporary situations.

***Teacher's Guide: Management of Wastes from Health Care Activities* by A. Prüss and W. K. Townsend**

1998, v + 227 pages (available only in English), WHO/EOS/98.8, CHF 35.-/USD 31.50; In developing countries: CHF 24.50, Order No. 1930134.

Contents

- definition and characterization of health care waste
- health impacts of health care wastes
- legislative, regulatory, and policy aspects
- health care waste management planning
- waste minimization, recycling, and reuse
- handling, storage, and transportation of health care wastes
- treatment and disposal technologies for health care waste
- application of treatment and disposal methods to health care waste categories
- collection and disposal of wastewater
- costs related to health care waste management
- health and safety practices for health care personnel and waste workers
- emergency response
- hospital hygiene and infection control
- training
- minimal programs for health care waste management
- guidance levels of activity for procedures in nuclear medicine for a typical adult patient
- chemical destruction methods for cytostatic drugs
- clearance levels for radioactive waste
- procedure to be followed in the event of accidental contamination by mutagenic or carcinogenic products

This volume is a spiral-bound collection of resource materials for use in a three-day training course focused on the safe management of health care wastes. Course materials are aimed at an audience of managers of hospitals and other health care establishments, policy-makers, and professionals involved in waste management. Noting that health care waste has a higher potential of infection and injury than any other type of waste, training materials aim both to heighten awareness of specific hazards and to illustrate the strategies—whether involving national legislation or safe practices at the institutional level—that can minimize these risks. The teacher's guide is a companion volume to the WHO handbook, *Safe Management of Wastes from Health Care Activities*, listed immediately above.

Training materials include ready-to-copy texts for overhead transparencies or slides, lecture notes, handouts, exercises, worksheets, and evaluation forms. Apart from drawing attention to the public health and environmental hazards of health care wastes, material for the course includes abundant technical information on various safe options for waste segregation, storage, collection, labeling, transport, treatment, and disposal.

Specific training materials range from overheads listing the components of national programs for waste management and outlining an action plan, through a handout illustrating technical options for waste treatment, to a worksheet for calculating the costs for construction and operation of an incineration plant. Advice on how to organize and conduct the course is provided together with suggestions for using problem-based approaches and supplementing the materials with locally relevant examples and exercises.

Reports from Commissions

Commission on Thermodynamics (I.2)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

Twenty-one members of the Commission on Thermodynamics (I.2), including national representatives and observers, met for three days of discussions during the 40th IUPAC General Assembly in Berlin. Two new Titular Members, Manuel Ribeiro da Silva and Eckhard Vogel, were elected, and R. Span (Bochum) was appointed to the Subcommittee on Thermodynamic Data.

Several projects were completed and the results published: U. K. Deiters and K. M. de Reuck, Guidelines for Publication of Equations of State, *Chemical Engineering Science*, 1998, **69**, 69 and Fluid Phase Equilibria, 1999, **161**, 205; A. Bolz, U. K. Deiters, C. J. Peter, and T. W. de Loos, Nomenclature for Phase Diagrams with Particular Reference to Vapor–Liquid and Liquid–Liquid Equilibria, *Pure Appl. Chem.*, 1998, **70**, 2233; J. Barthel, R. Neueder, and R. Meier 1998, *Viscosities of Aqueous Solutions*, Part 3c, AgClO₄–Cl₄O₁₆Th, and Part 3d, CoO₄S–O₆SU, Dechema Chemistry Data Series Vol. XII; and *Chemical Thermodynamics* (a Chemistry for the 21st Century monograph), edited by T. M. Letcher, Blackwell Science, 1999.

In addition, there are several projects that are close to completion: *Theory of Equations of State for Fluids and Fluid Mixtures*, edited by J. V. Sengers, will be published by Elsevier in mid-2000. Two new volumes in the Experimental Thermodynamics series are being prepared: Volume VI. *Measurement of the Thermodynamic Properties of Single Phases* (editors: A. R. H. Goodwin, K. N. Marsh, and W. A. Wakeham) and Volume VII. *Measurement of the Properties of Multiple Phases* (editors: Th. W. de Loos and R. D. Weir). Publication is expected by 2001. *Conductivities, Transference Numbers, and Limiting Ionic Conductivities*, Part 1d. Carbonates (project leader: J. G. M. Barthel), Dechema Chemistry Data Series, Volume X, is in press, and a further volume on amides is expected in 2001. Ribeiro da Silva presented a final draft of “Thermochemistry of chemical reactions”. Draft copies of papers entitled “Standards in isothermal microcalorimetry”, from Working Group A. (E. Beezer, G. Olofsson, K. Murphy, F. Rouquerol, J. Sipowska, and I. Wadsö), and “Standards for differential scanning calorimetry”, produced by Working Group G (Della Gatta, M. J. Richardson, S. M. Sarge, and S. Stølen) were presented. These papers will be produced in final form for the next

Commission meeting in 2000, for subsequent publication in *J. Chem. Thermodyn.*, *Thermochimica Acta*, and *Calorimetry and Thermal Analysis*. The project “Legendre transforms in chemical thermodynamics” (R. A. Alberty) will be completed after minor revision of the draft manuscript with input from members of the Commission on Electrochemistry. Possible new projects discussed were “Thermodynamics in education” (T. M. Letcher), “Global phase diagrams of fluid mixtures” (U. K. Deiters and T. M. Boublik), and “Guidelines for equations of state II. Mixtures” (U. K. Deiters). The importance of the project on biological buffers was stressed; it is necessary to find a group to work on this.

Unanimous approval was given of the arrangements for the 16th IUPAC International Conference on Chemical Thermodynamics (ICCT), which will take place 7–11 August 2000 in Halifax, Nova Scotia, Canada. In 2002, the 17th IUPAC ICCT will be held 28 July–2 August in Rostock, Germany. A diskette will be prepared to supplement the Guidebook for Organizers of IUPAC ICCTs to assist prospective organizers of these meetings. The Commission discussed the forthcoming change in IUPAC operation. It felt that its activities would translate smoothly to the new scheme, with continuation of the biennial ICCT affording an opportunity for a meeting of all those involved in projects, plus other interested thermodynamicists.

It was reported that the number of journal pages in the *Journal of Chemical Thermodynamics* increased by about 5% from 1997 to 1998 as a result of widening the scope to include papers in fluid phase equilibria, biochemical thermodynamics, polymers, and invited review articles. A special memorial issue for Prof. McGlashan will contain 14 papers and should be published in October 1999.

The Subcommittee on Thermodynamic Data has been active in the following areas: In the series of publications on *Critical Compilation of Vapor Liquid Critical Properties*, paper VII on oxygenated compounds other than alkanols is in an advanced state of preparation. Work on halogenated compounds is being updated with a computer search to cover recent years. Still outstanding are the series of compounds containing nitrogen and polyfunctional groups. The project “Critical compilation of activity coefficients at infinite dilution” (project leader: V. Dohnal) has produced a very large database, and it was decided to terminate the project at this stage. Publication of Volume 14 (Benzene) and Volume 15 (Carbon Dioxide) in the series *International Thermodynamic Tables of the Fluid State* (project

leader: W. A. Wakeham) is expected in 2000.

The project "Vapor-liquid equilibria and related properties in binary and ternary mixtures of ethers, alkanes, and alkanols" (project leader, J. H. Dymond) was completed following the final workshop held as part of the 15th IUPAC ICCT in Porto, Portugal, 30–31 July 1998. The workshop proceedings were published as a special issue of *Fluid Phase Equilibria*, 1999, **156**, 1–236. A new project "Thermochemical, thermodynamic, and transport properties of halogenated alkanes and their mixtures" (project leaders: U. K. Deiters, J. H. Dymond, A. Heintz, and A. Laesecke) will begin with a workshop that is being organized by E. Matteoli in Pisa 15–18 December 1999. A feasibility study will be undertaken for a project on low-temperature molten salts (organic) with a workshop in 2001.

The Subcommittee on Transport Properties has completed two projects that will be published "under the auspices of the Subcommittee": M. L. V. Ramires, C. A. Nieto de Castro, R. A. Perkins, Y. Nagasaka, A. Nagashima, M. J. Assael, and W. A. Wakeham, "Thermal conductivity of toluene over a wide range of temperature" and M. J. Assael, A. Leipertz, E. Vogel, E. MacPherson, W. A. Wakeham, R. A. Perkins, Y. Nagasaka, C. A. Nieto de Castro, and K. Strom, "Transport property measurement on the IUPAC sample of R134a". Already published is a correlation on the Viscosity of Propane by E. Vogel, C. Kuchenmeister, E. Bich, and A. Laesecke, *J. Phys. Chem. Ref. Data* 1998, **27**, 947. The first stage of a project by M. J. Assael, J. Millat, A. Nagashima, D. Friend, and J. V. Sengers, "Viscosity and thermal conductivity of water and steam", has been concluded with submission of a paper to *J. Phys. Chem. Ref. Data*. Drafts of papers on other completed projects are being prepared by M. J. Assael, "Viscosity of toluene as a function of pressure"; by E. Vogel, "Viscosity of isobutane"; by M. J. Assael and A. Nagashima, "Viscosity and thermal conductivity of D₂O"; and by C. A. Nieto de Castro, "Viscosity of toluene at atmospheric pressure in wide ranges of temperature".

Work is continuing on the following projects: "Viscosity of liquid water", "Transport properties of methane + ethane", "Thermal conductivity of butane", "Viscosity and thermal conductivity of water and steam", and "Viscosity of pentane". The following new projects are underway: "Study of the intermolecular potential of water", "Viscosity of cyclopentane", "Viscosity of alkali halides", and "Investigation of a new high-viscosity standard". A feasibility study will be undertaken for a book on the properties of water, air, and seawater. A new project on transport properties of molten metals (where differences in viscosity of a factor of 10 occur in measurements from different groups) will begin. A new experimental project on viscosity data for toluene

at elevated pressures will probably be set up, because of the large discrepancies that exist in the literature data. The project for an internationally available data bank is now terminated, although the Stuttgart data bank was still being maintained for use by subcommittee members and others.

The subcommittee had a successful meeting on 3–4 September 1999 in Erlangen, Germany. Their next meeting will take place in Boulder, CO, USA in June 2000.

Joint meetings were held as follows: Dr. Fabienne Meyers of the IUPAC Secretariat joined us for a short meeting during which she spoke about the IUPAC web site. Members considered that the Commission should have its own web site to highlight activities and achievements and draw attention to future events. Joint meetings were also held with members of IUCOSPED (IUPAC-CODATA Project on Standardization of Physico-Chemical Property Electronic Data Files), Commission I.1 (Physicochemical Symbols, Terminology, and Units), Commission I.3 (Electrochemistry), and Commission I.7 (Biophysical Chemistry). At each of these meetings, projects of common interest were discussed. With Commission I.1, further additions to the thermodynamics section of the Green Book (*Quantities, Units, and Symbols in Physical Chemistry*) were agreed upon for the forthcoming new edition.

The Chairman thanked all members of the Commission for their contributions and looked forward to the next meeting of the Commission in Halifax, Nova Scotia on 5–6 August 2000.

John Dymond
Secretary, IUPAC Commission on
Thermodynamics I.2

Commission on Chemical Kinetics (I.4)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–9 August 1999

The Chairman outlined the new structure and mission of IUPAC that would be put in place following the next General Assembly. The key elements, such as the move to a project-based structure and the reduction in costs of the General Assembly, were discussed in some detail; the general consensus of the members was that the new structure could lead to a more vigorous and accountable organization.

The status of ongoing projects was presented and discussed in light of the future work of the Commission or its successor. It was agreed that the three current data projects, "Evaluated chemical kinetic data for combustion chemistry"; "Aqueous solution kinetics data

for atmospheric chemistry”; and “Kinetic, photochemical, and heterogeneous data evaluation for atmospheric chemistry”, because of their great impact on modeling the production and control of environmental pollutants, would be continued through the next biennium. It was also decided to continue the project “Kinetics data for chemical processes under extreme conditions”, with a focus on supercritical fluid kinetics. The general consensus was that there is now a clear need to proceed by organizing a workshop on data and application needs.

It was also felt that a brief document addressing data needs in the area of free radical thermochemistry from the point of view of the chemical kinetics user community would be extremely valuable. This undertaking might also be of use in initiating a new project with the Subcommittee on Theoretical Chemistry of Commission I.5 to deal with computational aspects and prediction of thermodynamic properties of small free radicals and other critical reaction intermediates.

Dr. M. Rossi was reelected as Chairman and Dr. J. Herron was reelected as Secretary. Profs. D. Baulch and J. Troe and Dr. R. Huie agreed to serve as Titular Members, and Profs. Tibor Bérczes and John Plane have agreed to serve as Associate Members through 2001. Prof. E. Breet was elected as a new Titular Member.

John Herron
Secretary, IUPAC Commission on Chemical Kinetics I.4

Commission on Biophysical Chemistry (I.7)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–9 August 1999

“Recommendations for the presentation of NMR structures of proteins and nucleic acids” by J. L. Markley, A. Bax, Y. Arata, C. W. Hilbers, R. Kaptein, B. D. Sykes, P. E. Wright, and K. Wüthrich has been published in *Pure and Applied Chemistry* (Vol. 70, No. 1, pp. 117–142, 1998). To broaden its scientific impact, it has also been published in the *Journal of Biomolecular NMR*, the *European Journal of Biochemistry*, and *Biochemistry*. This important report will help to define how NMR results on macromolecules will be reported in the literature. Hans-Jürgen Hinz and Fred Schwarz reported on the status of their project “Recommendations for the measurement and the analysis of results obtained on biological substances with differential scanning calorimetry (DSC).” Their report contains a discussion of the basis of DSC as applied to biochemical denaturations, how one should use these instruments, and how the results should be analyzed and presented in the lit-

erature. This document is close to its final form. A major addition to the previous version is the inclusion of experimental results for lysozyme unfolding which were obtained from several participating laboratories. In a joint meeting with the Electroanalytical Chemistry Commission (V.5), Daniel Thévenot reported on his project “Electrochemical biosensors: Recommended definitions and classification.” This project, which is concerned primarily with terminology pertinent to electrochemical biosensors, is also close to completion now that the issue of “single-use” and “multiple-use” biosensors appears to have been resolved.

Two additional projects may be completed in the near future: “Redox potential measurements of proteins”, which was reported on by George Wilson, and “Terminology in the field of lipid vesicles (liposomes)”, which was reported on by Helmut Hauser. The latter project would have been completed except for the untimely death of Dimitri Papohadjopoulos, a key member of the working party. Two future projects that the Commission sees value in include “Recommendations for the measurement and analysis of results obtained by isothermal titration calorimetry (ITC)” and “Guidelines for the presentation of the results from computational chemistry.”

Productive, joint meetings were also held with Commission I.2 (Thermodynamics), Commission I.3 (Electrochemistry), Commission I.6 (Colloid, Surface Chemistry, and Catalysis), and Commission V.5 (Electroanalytical Chemistry). Kurt Wüthrich will succeed Helmut Hauser on 1 January 2000 as the Chairman of the Commission on Biophysical Chemistry (I.7).

Robert N. Goldberg
Secretary, IUPAC Commission on Biophysical Chemistry I.7

Commission on Atomic Weights and Isotopic Abundances (II.1)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

The Commission on Atomic Weights and Isotopic Abundances (II.1) met for three days of discussions under the chairmanship of Prof. Ludolf Schultz during the 40th IUPAC General Assembly in Berlin. The standard atomic weights of seven chemical elements have been changed significantly. Based on new determinations of isotopic abundances and reviews of previous isotopic abundances, the standard atomic weight of nitrogen was changed from 14.00674(7) to 14.0067(2), of sulfur from 32.066(6) to 32.065(5), of chlorine from

35.4527(9) to 35.453(2), of germanium from 72.61(2) to 72.64(1), of xenon from 131.29(2) to 131.293(6), of erbium from 167.26(3) to 167.259(3), and of uranium from 238.0289(1) to 238.02891(3). Many of these changes were adopted so that standard atomic-weight values more accurately reflect the values of these chemical elements in naturally occurring materials.

The changes in atomic-weight values will be reflected in the Table of Standard Atomic Weights 1999, which will be submitted for publication in *Pure and Applied Chemistry* (PAC) before the end of the year. Also planned for publication in PAC is a report on fourteen elements that show significant isotopic abundance variation in naturally occurring materials. This report demonstrates that the atomic weight of such elements can be significantly larger than the uncertainties of measurement. Publication of an element-by-element review was discussed and is planned for submission to PAC in 2000. The Commission discussed a glossary of definitions specific to atomic-weight and isotopic-abundance work in order that definitions generated would be submitted to nomenclature commissions for inclusion in future IUPAC documents. A large number of isotopic-abundance measurements in extraterrestrial materials is available; these data will be summarized and a draft will be available at the next General Assembly in Brisbane in 2001.

Tyler B. Coplen II

Chairman, IUPAC Commission II.1, Subcommittee on Natural Isotopic Fractionation

Commission on Nomenclature of Inorganic Chemistry (II.2)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 9–11 August 1999

Commission II.2 (CNIC) reviewed two documents that had been completed in August of 1998 but were found not ready at that time for forwarding to *Pure and Applied Chemistry*. There were some questions concerning the use of “ido” and “ato” in the inorganic radical document by Prof. Wim Koppenol. These matters were resolved and Prof. Koppenol will modify the document to remove inconsistencies. The document by Prof. Koppenol concerning the naming of elements 110 and higher was brought into conformance with the one presented to the Commission in August 1998 by Prof. John Corish, Prof. G. J. Leigh, and Dr. Gerd Rosenblatt. The Commission agreed unanimously that, to avoid confusion in the literature and electronic searching, if a name has been used unofficially for an element and that name is not accepted as the official IUPAC name, then it

should not be proposed for another element at a future date.

The publication date for Red Book II will depend upon how quickly arrangements are concluded with a publisher. A document on muon nomenclature, also by Prof. Koppenol, was revisited and, with minor revisions, was approved to go forward. It will be submitted to Commission V.7 (Radiochemistry and Nuclear Techniques) for comment before proceeding. The organometallic paper by Prof. Albrecht Salzer will be submitted to PAC after IDCNS review.

The revision of Red Book I continues under the direction of Prof. Neil Connelly. This revision will include the chapter on ligand abbreviations, errors will be removed, and the nomenclature will be made consistent for all chapters. A separate project was proposed and accepted for this update of Red Book I under the new IUPAC project-managed system. A progress report on computer-assisted nomenclature was presented, and it showed that it is possible to generate a number of unique structures for convex polyhedra. However, it was noted that purely mathematical solutions were unsatisfactory unless parameters were added to eliminate chemically improbable solutions. A joint meeting was held with the Commission on Nomenclature of Organic Chemistry (CNOC) to discuss common areas of concern. Members of both Commissions involved in computer-assisted nomenclature will meet to discuss common goals. At the joint meeting, it was agreed to continue a collaborative effort to produce a book on organometallic nomenclature. CNOC will work on main group elements, and CNIC will work on transition metals (Prof. Salzer's document and metallacycles). Additionally, other chapters will be solicited. These two efforts, computer-assisted nomenclature and organometallic nomenclature, are expected to develop into separate projects under the project-funded system. A metallacyclic paper by Prof. Yohsuke Yamamoto was discussed, and further revisions will be made and circulated to the Commission members before the next meeting. The Commission will meet again in August 2000 in Dublin, Ireland.

James B. Casey

Associate Member, IUPAC Commission on Nomenclature of Inorganic Chemistry II.2

Commission on Photochemistry (III.3)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 7–11 August 1999

Six members of the Commission on Photochemistry (III.3), including one observer, met for five days of discussions during the 40th IUPAC General Assembly in Berlin.

During 2000 and 2001, Commission III.3 will continue to function as before. R. G. Weiss and J. Wirz were elected Chairman and Secretary, respectively. The Organic Division Committee will have a Photochemistry Representative, Dr. Silvia Braslavsky. The possibility of funneling perceived needs and interests of the photochemistry community from the presidents of the major photosciences professional organizations through the Divisional Representative was discussed. Meetings concerning common interests and joint projects were held with the Commissions on Physical Organic Chemistry (III.2), Colloid and Surface Chemistry Including Catalysis (I.6), and Chemical Kinetics (I.4).

Reports on the status of ongoing projects in several areas were received. An excellent draft document on "Photochromism" was presented by H. Bouas-Laurent and H. Durr. H. Masuhara presented a first draft of "Highly resolved photochemistry in space and time". J. R. Bolton presented a version of "Ultraviolet disinfection" that should be ready for submission to IUPAC before the end of 1999. This working group carried out all of its interactions by e-mail. The document, *Figures-of-Merit for the Technical Development and Application of Advanced Oxidation Technologies for both Electric- and Solar-Driven Systems*, already accepted as a technical report by IUPAC, will be submitted for inclusion as a standard. Future report projects are being considered in the areas of actinometry (revision of existing document), photodynamic therapies, photolithography, photopolymers and photopolymerizations, single molecule detection, glossary of terms (revision of existing document), supramolecular photochemistry, and glossary of terms in photocatalysis (with Commission I.6).

Richard Weiss
Secretary, IUPAC Commission on Photochemistry III.3

Commission on Microchemical Techniques and Trace Analysis (V.2)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–9 August 1999

The Commission meeting was attended by seven of the Commission's sixteen members. Three members had resigned since the last meeting, among them the former chairman. Dr. Ryszard Lobinski was elected Titular Member and new Chairman of the Commission. A new National Representative from Korea had been suggested by the Korean NAO, and Prof. Heon Kang was accepted as a new member of the Commission.

The status of current projects was reviewed. Five projects were canceled because no activity had occurred since the last meeting and the person responsible for them had left the Commission. For the remaining projects, completion before 2001 is foreseen. It was decided not to start any new projects at this stage. A discussion of new projects is being initiated through e-mail, and a final choice will be made at the next even-year meeting in Pau.

The joint project on guidelines for terms related to speciation was the subject of a separate meeting. Comments received from outside experts were discussed, and it was decided to hold a meeting in Brussels in March to work these comments into the final version of the Recommendations to be published in *Pure and Applied Chemistry*.

Lars-Göran Danielsson
Secretary, IUPAC Commission on Microchemical Techniques and Trace Analysis V.2

Commission on Atmospheric Chemistry (VI.2)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 9 August 1999

Eleven members of Commission VI.2, including Observers and National Representatives, met during the 40th IUPAC General Assembly in Berlin. It was the first meeting of Commission VI.2 since the one held during the successful IUPAC Conference on Degradation Processes in the Environment organized in May 1998 in Dubrovnik, Croatia together with the Commission on Water and Soil Chemistry (VI.3).

In Dubrovnik, the proposal for reorganization of IUPAC was announced for the first time, and Commission VI.2, together with Commission VI.3, expressed some concern in a letter sent to the President of the



Members of Commission VI.2 at their August 1999 meeting in Berlin, Germany.

Chemistry and the Environment Division (DCE).

In Berlin, the minutes of the Dubrovnik meeting were accepted with corrections. Concerning the new organization of IUPAC, whereby the commissions cease to exist by the end of 2001, it was decided to go along with the new structure and task forces for new projects coming out of Commission VI.2. The new proposals will be submitted to the DCE during the General Assembly in Berlin and sent in to the Secretariat immediately afterwards.

The ongoing projects (project leaders are given in parentheses) were reviewed.

Commission VI.2 decided to have two continuous projects: i) "Articles on local environmental problems" (Hertel, Zhang, Klasinc), to be published by members in *Chemistry International*, and ii) the Internet web page of Commission VI.2 (Klasinc, Slanina), and concluded that most projects are finished or will be finished by 2001. Completed projects include the following:

- i) "Development of diffusive samplers" (Brown), with a manuscript sent to *Pure and Applied Chemistry (PAC)* for publication
- ii) "Modeling lifetime and degradability of organic compounds" (Klasinc), with conference proceedings to be published in *PAC* and in *Chemosphere*
- iii) "Photocatalytic and catalytic effects on aerosol surface in the atmosphere" (Bazhin), presented and published in ii) and in *Chemosphere*

The project "Distribution and seasonal variation of regional ozone" (Akimoto) has been canceled by the project leader and projects on "Followup workshop measurement techniques in atmospheric chemistry" (Tavares) and "Photochemical reactions of coordination compounds in water droplets in the atmosphere" (Bazhin) have been extended.

Concerning cooperation with other Commissions, on the project with Commission V.8, "Chemicals in the atmosphere: Solubilities in aqueous media" (Schwartz), a book is in preparation with Wiley. The project with

Commission I.4, "Aqueous solution kinetics data for atmospheric chemistry", will continue with a new leader from Commission VI.2 (Pienaar).

The new proposed task force projects and their leaders and duration (given in parentheses) are as follows:

- 1) "Glossary of atmospheric chemistry" (Schwartz, 1999–2001)
- 2) "Workshop on atmospheric deposition in Israel 2000" (van Grieken, 1999–2001)
- 3) "Local radiation balance: Influence of aerosol" (Slanina 1999–2002)
- 4) "Workshop on local air pollution in developing countries in Guanzhou" (Zhang, 1999–2001 or 2000–2002)
- 5) "Assessment of human exposure to outdoor pollution" (Hertel, 1999–2002)

Project 1 is a revision of the glossary published by J. Calvert in *PAC* in 1990; Projects 2–5 will be pursued in cooperation with Commission VI.3; with ECN and EU; interdivisionally and with IOCD and WHO; and with EU, respectively.

For 2000–2001, the membership of Commission VI.2 was recommended to comprise four Titular Members (the Chairperson acting also as member of the DCE Division Committee), five Associate Members, eight National Representatives, and three Observers.

Leo Klasinc

Secretary, IUPAC Commission on Atmospheric Chemistry VI.2

Commission on Soil and Water Chemistry (VI.3)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

In addition to the regular meeting of Commission VI.3, joint meetings with representatives from Commissions VI.1, VI.2, and VI.4 were organized.

The major achievement of the meetings was the restructuring of the Commissions' projects to focus on a limited number of projects that in the future will be carried out by project teams of varying composition. The Commission will be terminated on 31 December 2001, and a project-driven structure will replace it. The link of titular membership to funding will be broken, and funding for participation in each project will be determined on an ad hoc basis. For the biennium 2000–2001, the current Commission and the current project and funding systems will continue largely unchanged. However, intensive planning must take place to ensure a smooth changeover for 2002.

In light of these changes, the incoming President of the Division on Chemistry and the Environment (DCE), Prof. Dr. Werner Klein, made a strong appeal to focus on interdivisional projects that are likely to obtain more funding. Examples of interdivisional projects that are potentially of interest to Commission VI.3 may be found in the area of green/sustainable chemistry. Commission VI.3 was challenged to take up part of the work to be done within this new IUPAC initiative. It was noted that under the new structure, it is quite possible to solicit and include participation of other organizations in the field.

In anticipation of the new IUPAC structure, Commission VI.3 has already installed one Task Force, headed by Dr. J. Lintelmann. A draft report from this Task Force was prepared and discussed during the Commission VI.3 meeting. In addition, proposals for three new Task Forces were prepared in advance of the meeting and evaluated according to the new IUPAC reviewing system. During the Berlin meeting, Commission VI.3 decided to propose to DCE that two additional new Task Forces be initiated in the following areas:

- In situ treatment of polluted soil and water, with emphasis on the use of genetically engineered microorganisms (proposed project leader: Dr. R. Mandelbaum)
- Airborne and remote monitoring of water quality: Evaluation of remote sensing techniques for real-time control of water quality in surface water bodies (proposed project leader: Dr. A. Dekker)

Interdivisional cooperation will be sought for projects on quality chemical data and reporting practices and on biosensors.

To facilitate these interdivisional projects, Commission VI.3 members will contribute to the following projects of other DCE Commissions:

- Atmospheric deposition in drinking water reservoirs (VI.2)
- Soil sorption (VI.4)
- Pesticide residues (VI.4)
- Bioavailability (VI.4)

Another major achievement of Commission VI.3 was the organization of the IUPAC-sponsored conference on Environmental Degradation Processes held 24–28 May 1998 in Dubrovnik, Croatia. Approximately 100 participants from academia, industry, and regulatory agencies attended this very successful conference. Manuscripts from the seven invited speakers were published in the July 1998 issue of *Pure and Applied Chemistry (PAC)*, and contributions from the remaining speakers were published as a special volume of *Chemosphere* (January 1999 issue). A final report, containing the main findings and recommendations for further followup, will be prepared by Dr. A. Sabljic and Dr. W. J. G. M. Peijnenburg before the end of 1999. The following items were identified as possible future projects:

- Impact of environmental characteristics on biodegradation
- Long-term stability: How to measure very long half-lives (> 1 year) of persistent chemicals
- Persistence of chemicals in deep groundwaters, with focus on fate of pesticides in relation to impact on top underground layer
- Use of Quantitative Structure–Activity Relationships (QSARs) and Quantitative Structure–Biodegradation Relationships (QSBRs) in wastewater treatment. Prof. Y. Wang will prepare an outline for possible future activities in this field.

W. J. G. M. Peijnenburg
Secretary, IUPAC Commission VI.3

Conference Announcements

**Advanced Principles of Toxicology,
24 April–5 May 2000,
Guelph, Ontario, Canada**

This two-week, graduate equivalent open learning course at the University of Guelph is designed for professionals working in toxicology-related fields. It is jointly organized by the University of Guelph's Centre for Toxicology and Department of Environmental Biology and the Canadian Network of Toxicology Centres.

This course is an advanced survey covering many aspects of toxicology. It is designed for people in in-

dustry, government, or education who are planning to work or are currently working in areas related to toxicology. Learners will receive basic background information in important traditional areas in toxicology, as well as in areas that are currently developing. This background information will include principles, definitions, and basic information, and it is designed to bring participants up to current levels of understanding of toxicology as it applies to both the human health and environmental areas of toxicology. This graduate level equivalent course normally requires that learners have a bachelor's or master's degree with course work in

statistics, chemistry, and biology.

Toxicology topics covered will include mechanism of toxic action, toxicological principles (mammals), human health risk assessment, developmental and reproductive toxicology (mammals), endocrine modulators, epidemiology, ecotoxicology (plants), carcinogenicity, ecotoxicology (animals), and ecotoxicological risk assessment.

For more information on course content, contact Dr. Len Ritter or Dr. Keith Solomon, Tel.: +1 519 837 3320; Fax: +1 519 837 3861. For information about registration, contact Office of Open Learning, University of Guelph, 159 Johnston Hall, Guelph, Ontario, N1G 2W1, Canada; Tel.: +1 519 767 5000; Fax: +1 519 767 1114; Web site: www.open.uoguelph.ca/.

6th World Congress on Environmental Health, 5–9 June 2000, Oslo, Norway

This meeting, held on behalf of the International Federation of Environmental Health (IFEH) has the theme "Healthy Environments—The Local Challenge". It will offer a comprehensive professional program and an exhibition covering key issues concerning environmental health in the 21st century. A variety of social activities will add a creative framework for a meeting place for professionals, experts, and scientists; politicians and decision makers of various sectors and levels; and grassroots workers, activists, and other local partners involved in the design and implementation of strategies, concepts, and projects associated with environmental health. The deadline for submission of abstracts is 20 September 1999.

For further information, contact Øystein Peder Solevåg, Senior Executive Officer, Norwegian Board of Health, P. O. Box 8128, Dep, N-0032 Oslo, Norway; E-mail: oystein.solevaag@helsetilsynet.dep.telemax.no; Tel.: +47 22 24 90 74; Fax: +47 22 24 95 91; Web sites: <http://www.fmh.no> and <http://www.helsetilsynet.no/>.

17th International Conference on Raman Spectroscopy (ICORS 2000), 20–25 August 2000, Beijing, China

This conference, to be held at Peking University, will address all topics related to advances in Raman spectroscopy and Brillouin and Rayleigh scattering. Manufacturers of Raman and related instruments will present their products in an associated exhibition. Satellite meetings will be held as follows: Progress in Surface Raman Spectroscopy: Theory and Practice, 17–19 August, Xiamen, Fujian; Spectroscopy of Super-Thin Films and Related Systems, 27–30 August, Xi'an,

Shanxi; Spectroscopy of Superlattice, HTSC, and CMR Materials, 27–30 August, Kunming, Yunnan Province.

For more information, contact Prof. Hetian Zhou, Secretary General, Department of Physics, Peking University, Beijing 100871, China; E-mail: icors@pku.edu.cn; Tel.: +86 10 6275 1750; Fax: +86 10 6275 9117; Web site: <http://www.pku.edu.cn/others/icors/icors.html>.

27th International Conference on Solution Chemistry (27ICSC), 26–31 August 2001, Vaals, Netherlands

The scientific program for this meeting will include sessions on molecular liquids, nonelectrolyte solutions, electrolyte solutions, ionic liquids, molten salts and metals, and colloids in liquids. Each field will be represented by three invited talks on theory, computer simulation, and experimental aspects.

For additional information, contact Dr. Christian Dux, Conference Secretary of 27th ICSC, Institute of Physical Chemistry, RWTH-Aachen, D-52062, Aachen, Germany; E-mail: 27icsc@liquid.pc.rwth-aachen.de; Tel.: +49 241 80 4752 or +49 241 80 4712; Fax: +49 241 8888 327 or +49 241 8888 128.

International Conference on Photophysics and Photochemistry (PP 2000), 19–21 October 2000, Oeiras, Portugal

This meeting will take place in honor of the 75th birthday of Prof. Ralph S. Becker. The scientific program will focus on fundamental aspects of photochemistry, photophysics, and photobiology, such as photoinduced electron and proton transfer, photoisomerization, photochromism, photosensitization, single molecule spectroscopy, polymer stabilization and dynamics, transient spectroscopy, and related topics. The conference will have a limited number of 120 participants, and it will include 5 plenary lectures, 12 invited and contributed lectures, and 2 poster sessions.

For more information, contact Organizing Committee PP 2000, ITQB, Apartado 1327, P-2781-901 Oeiras, Portugal; E-mail: pp2000@itqb.unl.pt; Tel.: +351 21 446 9727 or +351 21 446 9712; Fax: 351 21 441 1277; Web site: <http://www.itqb.unl.pt/pp2000/>.

Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

NEW designates a new conference since the last issue.

2000

Materials Science

8–9 April 2000
Preconference Workshop
10–12 April 2000
UNESCO School and Conference
on Macromolecules and Materials
Science, Stellenbosch, South
Africa.
*Prof. R.D. Sanderson, UNESCO
Associated Centre for Macromol-
ecules and Materials Institute for
Polymer Science, University of
Stellenbosch, Private Bag X1,
Matieland 7602, South Africa.*
Tel.: +27 21 808 3172
Fax: +27 21 808 4967
E-mail: rds@land.sun.ac.za

High-Temperature Materials Chemistry

10–14 April 2000
10th International Conference on
High-Temperature Materials
Chemistry, Aachen, Germany.
*Prof. Klaus Hilpert,
Forschungszentrum Jülich GmbH,
Institut für Werkstoffe der
Energietechnik (IWE 1), 52425
Jülich, Germany.*
Tel.: +49 2461 61 3280
Fax: +49 2461 61 3699
E-mail: k.hilpert@fz-juelich.de

Mycotoxins and Phycotoxins

21–25 May 2000
10th International IUPAC Sympo-
sium on Mycotoxins and
Phycotoxins, Sao Paulo, Brazil.
*Dr. Myrna Sabino, Instituto
Adolfo Lutz, AV Dr. Arnaldo 355,
Sao Paulo, Brazil, 01246-902.*
Fax: +455 (11) 853 3505
E-mail: Myrna@Sti.COM.BR

Polymer-Based Technology

21–26 May 2000
9th International Conference on
Polymer-Based Technology
(POC'2000),
Tianjin, China.
*Prof. Zhang Zhengpu
Institute of Polymer Chemistry
Nankai University
94 Weijin Road
Tianjin 300071, China*
Tel.: +86 22 2350 1386
Fax: +86 22 2350 4853
*E-mail:
zhangzp@sun.nankai.edu.cn*

Flow Analysis

25–29 June 2000
8th International Conference on
Flow Analysis, Warsaw, Poland.
*Prof. Marek Trojanowicz, Depart-
ment of Chemistry, University of
Warsaw, Pasteura 1, 02-093
Warsaw, Poland.*
Tel/Fax: +48 22 822 35 32
E-mail: trojan@chem.uw.edu.pl

Organic Synthesis

1–5 July 2000
13th International Conference on
Organic Synthesis (ICOS-13),
Warsaw, Poland.
*Prof. M. Makosza, Institute of
Organic Chemistry, Kasprzaka
44, 01-224 Warsaw 42, PO Box
58, Poland.*
Tel.: +48 22 631 8788
Fax: +48 22 632 6681
E-mail: icho-s@ichf.edu.pl

Chemical Sensors

3–5 July 2000 (new dates!)
8th International Meeting on
Chemical Sensors
(ES-IMCS'2000), Basel, Switzer-
land (new place!).
*Prof. Milena Koudelka-Hep,
Institute of Microtechnology,
University of Neuchatel, Switzer-
land.*
*Conference Secretariat: Phillipa
Orme.*
Tel/Fax: +44 1235 868811
E-mail: p.orme@dial.pipex.com

Physical Organic Chemistry

8–13 July 2000
15th International Conference on
Physical Organic Chemistry
(ICPOC 15), Göteborg, Sweden.
*Prof. P. Ahlberg, Organic Chemis-
try, Department of Chemistry,
Göteborg University, SE-412 96,
Göteborg, Sweden.*
Tel.: +46 31 7722900
Fax: + 46 31 7723843
*E-mail:
Per.Ahlberg@oc.chalmers.se*

Macromolecules

9–14 July 2000
38th International Symposium on
Macromolecules (MACRO 2000),
Warsaw/Lodz, Poland.
*Prof. Stanislaw Penczek, Polish
Academy of Sciences, ul.
Sienkiewicza 112, 90363 Lodz,
Poland.*
Tel.: +48 42 81 9815
Fax: +48 42 684 7126
*E-mail:
spenczek@bilbo.cbmm.lodz.pl*

How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsorship, conference organizers should complete an Advance Information Questionnaire (AIQ). The AIQ form is available at <http://www.iupac.org> or by request at the IUPAC Secretariat, and should be returned between 2 years and 12 months before the conference. Further information on granting sponsorship is included in the AIQ and available online.

Coordination Chemistry

9–14 July 2000

34th International Conference on Coordination Chemistry (34-ICCC), Edinburgh, Scotland.

Prof. P. Tasker, Chairman
Dr. John F. Gibson, Secretary
The Royal Society of Chemistry,
Burlington House, London W1V
OBN, UK.

Tel.: +44 171 440 3321

Fax: +44 171 734 1227

E-mail: gibsonj@rsc.org

Polymers in Medicine

17–20 July 2000

40th Microsymposium on Polymers in Medicine, Prague, Czech Republic.

Dr. Jaromir Lukas, Institute of
Macromolecular Chemistry,
Academy of Science of the Czech
Republic, Heyrovskeho nam. 2,
162 06 Praha 6, Czech Republic.

Tel.: +420 2360341

Fax: +420 2367981

E-mail: sympo@imc.cas.cz

Polymer Networks '2000

17–21 July 2000

15th Polymer Networks Group Meeting "Polymer Networks '2000", Cracow, Poland.

Prof. H. Galina, Rzeszow Univer-
sity of Technology, Faculty of
Chemistry, W. Pola Str.2, PL 35-
959 Rzeszow, Poland.

Tel.: +48 17 628 057

Fax: +48 17 854 3655

E-mail: hgal@prz.rzeszow

Photochemistry

22–27 July 2000

18th IUPAC Symposium on Photochemistry, "Photochemistry into the New Century", Dresden, Germany.

Prof. Dr. Silvia E. Braslavsky,
Max-Planck Institut für
Strahlenchemie, Postfach 101365,
D-45413 Mülheim an der Ruhr,
Germany.

Tel: +49 (208) 306 3681

Fax: +49 (208) 306 3951

E-mail: braslavskys@mpi-
muelheim.mpg.de

Organometallic Chemistry

23–28 July 2000

19th International Conference on Organometallic Chemistry (XIX ICOMC), Shanghai, China.

Profs. Li Xin Dai and Chang Tao
Qian, Chairmen, Prof. Xue Long
Hou, Secretary, Shanghai
Institute of Organic Chemistry,
Chinese Academy of Sciences,
354 Fenglin Road, Shanghai
200032, PR, China,

Tel.: +86 21 641 63300

Fax: +86 21 641 66128

E-mail: xlhou@pub.sioc.ac.cn

Solubility Phenomena

25–28 July 2000

9th International Symposium on Solubility Phenomena (9th ISSP), Hammamet, Tunisia.

Prof. Najia Kbir-Arighuib, Na-
tional Institute for Scientific and
Technical Research, P.O. Box 95,
Hamam-Lif, 2050 Tunisia.

Tel: +216 1 430 215

Fax: +216 1 430 934

E-mail: arighuib@planet.tn

Chemical Education

5–10 August 2000

16th International Conference on Chemical Education: Chemistry for a Healthier Planet (16 ICCE), Budapest, Hungary.

Prof. Alajos Kalman, Chairman,
Prof. Gabor Naray-Szabo,
Department of Theoretical
Chemistry, Lorand Eotvos
University, Pazmany Peter st. 1b,
H-1117 Budapest, Hungary.

Tel.: +36 1 209 0555, ext. 16-30

Fax: +36 1 209 0602

E-mail: mail2.mke@mtesz.hu

Chemical Thermodynamics

6–11 August 2000

16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, Canada.
Prof. M. A. White, Department of
Chemistry, Dalhousie University,
Halifax, Nova Scotia B3H 4J3,
Canada.

Tel.: +1 902 494 3894

Fax: +1 902 494 1310

E-mail:

Mary.Anne.White@DAL.CA

Thermal Analysis and Calorimetry

14–18 August 2000

12th International Congress on Thermal Analysis and Calorimetry, Copenhagen, Denmark.
Dr. O. Toft Sorensen, Materials
Research Department,
Riso National Laboratory DK-
4000, Roskilde, Denmark.

Tel: +45 4677 5800

Fax: +45 4677 5758

E-mail: o.toft.sorensen@risoe.dk

Chemical Sensors

27–30 August 2000 (new dates!)
EUROSENSORS XIV, the 14th European Conference on Solid-State Transducers, Copenhagen Denmark (new place!).

Dr. Siebe Bouwstra, Chairman,
Mikroelektronik Centret DTU,
Building 345 East, DK-2800
Lyngby, Denmark.

Euroensors XIV Secretariat: Van
Hauen ApS, Amaliegade 36, DK-
1256 Copenhagen K, Denmark.

Tel.: +45 33140050

Fax: +45 33145750

E-mail:

euroensors@vanhauen.dk

Biotechnology

3–8 September 2000
11th International Biotechnology Symposium, Berlin, Germany.
Prof. G. Kreysa, DECHEMA e.V.— c/o 11th IBS, Theodor-Heuss-Allee 25, 60486 Frankfurt/Main, Germany.
Tel.: +49 69 7564 235 / -249
Fax: +49 69 7564 176 / -304
E-mail: biotechnology2000@dechema.de

Nuclear and Radiochemistry

3–8 September 2000
5th International Conference on Nuclear and Radiochemistry (NRC5), Pontresina, Switzerland.
Prof. H. W. Gäggeler, Chairman, Mrs. R. Lorenzen, Secretary, Paul Scherrer Institut, CH-5232 Villigen-Ost, Switzerland.
Tel.: +41 56 310 2401
Fax: +41 56 310 4435
E-mail: ruth.lorenzen@psi.ch

Analytical Chemistry

3–9 September 2000
EUROANALYSIS XI, Lisboa, Portugal.
Prof. Maria Filomena Camões, Chair, Dr. Cristina Oliveira, Secretary, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade de Lisboa, Edifício C1-5º Piso, P-1700 Lisboa, Portugal.
Tel.: +351 1 3906138
Fax: +351 1 3909352; 7500088
E-mail: euroanalysisxi@fc.ul.pt

Natural Products

4–8 September 2000
22nd International Symposium on the Chemistry of Natural Products, Sao Paulo, Brazil.
Dr. M. Fátima das G.F. da Silva, Universidade Federal de Sao Carlos, Depto. de Quimica, Via Washington Luiz, km 235, CP676, Sao Carlos, Sao Paulo, Brazil.
Tel.: +55 16 274 8208
Fax: +55 16 274 8350
E-mail: dmfs@power.ufscar.br

Medicinal Chemistry

18–22 September 2000
XVI International Symposium on Medicinal Chemistry, Bologna, Italy.
Prof. C. Melchiorre, Università di Bologna, Dipartimento di Scienze Farmaceutiche, Via Belmeloro 6, I-40126 Bologna, Italy.
Tel.: +39 051 259 706
Fax: +39 051 259 734
E-mail: camelch@alma.unibo.it

Trace Elements in Food

9–11 October 2000
Warsaw, Poland.
Prof. B. Szeke, Chairman, Dr. R. Jedrzejczak, Secretary, Institute of Agricultural and Food Biotechnology ul. Rakowiecka 36 02-532 Warsaw, Poland.
Tel.: +48 22 606 3876
Fax: +48 22 4904 28
E-mail: jedrzejczak@ibprs.waw.pl

Food Packaging

8–10 November 2000
2nd International Symposium on Food Packaging—Ensuring the Safety and Quality Food, Vienna, Austria.
Liên-Anh Tran, ILSI Europe, 83, Avenue E. Mounier, Box 6, B-1200, Brussels, Belgium.
Tel.: +32 (2) 771 0014
Fax: +32 (2) 762 0044
E-mail: anh@ilsieurope.be

Polymers

20–24 November 2000
7th Latin-American Symposium on Polymers (SLAP'2000) and 5th Ibero American Congress on Polymers, Havana, Cuba.
Dr. Ricardo Martínez, Dr. Waldo Argüelles-Monal, IMRE, Universidad de La Habana La Habana 10400, Cuba.
Fax: +53 7 33 42 47
E-mail: slap@imre.oc.uh.cu

Visas

It is a condition of sponsorship that organizers of meetings under the auspices of IUPAC, in considering the locations of such meetings, should take all possible steps to ensure the freedom of all bona fide chemists from throughout the world to attend irrespective of race, religion, or political philosophy. IUPAC sponsorship implies that entry visas will be granted to all bona fide chemists provided application is made not less than three months in advance. If a visa is not granted one month before the meeting, the IUPAC Secretariat should be notified without delay by the applicant.

2001

Chemistry and Chemical Engineering

16–20 April 2001
IV International Congress on Chemistry and XIII Caribbean Conference on Chemistry and Chemical Engineering, Havana, Cuba.
Prof. Alberto J. Nunez Selles, Sociedad Cubana de Química, Ave 21&200, Atabey, Apdo. 16042, CP 11600, Havana, Cuba.
Tel.: +537 218 178
Fax: +537 336 471
E-mail: cqf@infomed.sld.cu

CHEMRAWN XIV

9–13 June 2001
Chemrawn Conference—Toward Environmentally Benign Processes and Products, Boulder, Colorado, USA.
Dr. Dennis L. Hjeresen, Environmental Management Program, Los Alamos National Laboratory - Mail Stop J591, Los Alamos, NM 87545.
Tel.: +1 505 665 7251
Fax: +1 505 665 8118
E-mail: dennish@lanl.gov

IUPAC 41st General Assembly

29 June–8 July 2001
Brisbane, Australia.
IUPAC Secretariat.
Tel.: +1 919 485 8700
Fax: +1 919 485 8706
E-mail: secretariat@iupac.org

IUPAC 38th Congress / World Chemistry Congress 2001

1–5 July 2001
Brisbane, Australia.
Congress Secretariat, P.O. Box 177, Red Hill Q 4054, Australia.
Tel.: + 61 7 3368 2644
Fax: + 61 7 3369 3731
E-mail: wcc2001@ccm.com.au

Scattering Methods and Polymers

NEW

9–12 July 2001
20th Discussion Conference on Scattering Methods for the Investigation of Polymers, Prague, Czech Republic.
Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovskeho nam. 2, CZ-162 06 Praha 6, Czech Republic.
Tel.: +420 2 204 0332
Fax: +420 2 367 981
E-mail: sympo@imc.cas.cz

Polymer Membranes

NEW

16–19 July 2001
41st Microsymposium on Polymer Membranes, Prague, Czech Republic.
Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovskeho nam. 2, CZ-162 06 Praha 6, Czech Republic.
Tel.: +420 2 204 03332
Fax: +420 2 367 981
E-mail: sympo@imc.cas.cz

Phosphorus Chemistry

29 July–3 August 2001
15th International Conference on Phosphorus Chemistry, Sendai, Japan.
Prof. Masaaki Yoshifuji, Department of Chemistry, Graduate School of Science, Tohoku University, Aoba, Sendai 980-8578, Japan.
Tel.: +81 22 217 6558
Fax: +81 22 217 6562
E-mail: yoshifuji@mail.cc.tohoku.ac.jp

Analytical Sciences

6–10 August 2001
International Congress on Analytical Sciences 2001 (ICAS2001), Tokyo, Japan.
Prof. Tsuguo Sawada, Chairman, Department of Applied Chemistry, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan.
Tel.: +81 3 5841 7236 (or 7237)
Fax: +81 3 5841 6037
E-mail: icas2001@laser.t.u-tokyo.ac.jp

Biodiversity

3–8 November 2001
3rd IUPAC International Conference on Biodiversity (ICOB-3), Antalya, Turkey.
Prof. B. Sener, Department of Pharmacognosy, Faculty of Pharmacy, Gazi University, P.O. Box 143 06572, Maltepe-Ankara, Turkey.
Tel.: +90 312 212 2267
Fax: +90 312 213 3921
E-mail: blgsener@tr-net.net.tr

Sweeteners

13–17 November 2001
2nd International Symposium on Sweeteners, Hiroshima-Shi, Japan.
Prof. Kasuo Yamasaki, Institute of Pharmaceutical Sciences, Faculty of Medicine, Hiroshima University Kasumi, Minami-ku, Hiroshima 734-8551, Japan.
Tel.: +81 82 257 5285
Fax: +81 82 257 5289
E-mail: yamasaki@pharm.hiroshima-u.ac.jp

Chemistry International

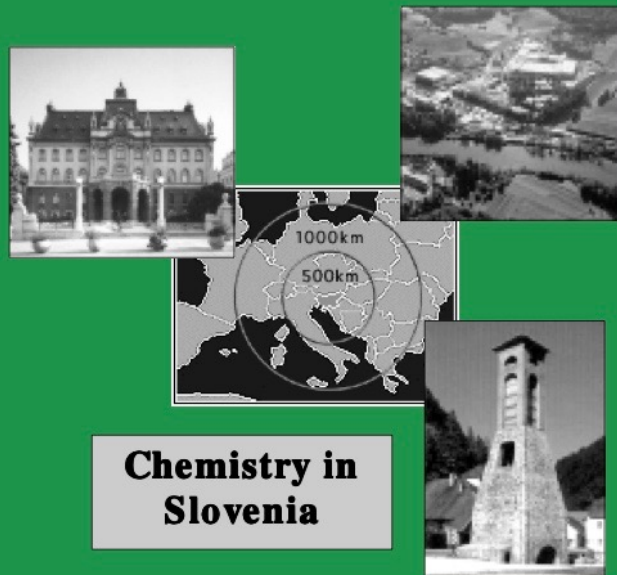
2000, Vol. 22, No. 3 (May)



- 65 Chemistry in Slovenia
- 70 News from IUPAC
- 70 A Strategy for Educational Policy
- 78 Reports from IUPAC-Sponsored Symposia
- 81 New Projects
- 82 New Books and Publications
- 85 Letter to the Editor
- 86 Reports from Commissions and Division Committees
- 90 Provisional Recommendations
- 90 Conference Announcements
- 92 Conference Calendar

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)



ISSN 0193-6484



2000, Vol. 22, No. 3 (May)

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

PUBLICATIONS MANAGER: Alan J. Senzel
PRODUCTION EDITOR: Cheryl Wurzbacher

All correspondence to be addressed to The Editor, *Chemistry International* (CI), IUPAC Secretariat, P. O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Telephone: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: edit.ci@iupac.org and <http://www.iupac.org/publications/ci/>

Subscriptions

Six issues of *Chemistry International* (ISSN 0193-6484) will be published bimonthly in 2000 (one volume per annum) in January, March, May, July, September, and November. The 2000 subscription rate is USD 99.00 for organizations and USD 45.00 for individuals. Subscription orders may be placed directly with the IUPAC Secretariat. Affiliate Members receive CI as part of their Membership subscription, and Members of IUPAC bodies receive CI free of charge.

Reproduction of Articles

Unless there is a footnote to the contrary, reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original in *Chemistry International*.

Periodicals postage paid at Durham, NC 27709-9998 and additional mailing offices. POSTMASTER: Send address changes to *Chemistry International*, IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757.

Front cover: Clockwise from left: main building of the University of Ljubljana, Krka Pharmaceutical Company, old-fashioned iron smelting furnace; center: Slovenia's geographical position in Europe.

Printed by: Cadmus Journal Services, Easton, MD, USA

International Union of Pure and Applied Chemistry

International Union of Pure and Applied Chemistry (IUPAC)



President: A. HAYES (UK)
Vice President: P. S. STEYN (South Africa)
Past President: J. JORTNER (Israel)

Secretary General: E. D. BECKER (USA)
Treasurer: C. F. BUXTORF (Switzerland)

IUPAC Secretariat

P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Tel.: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: secretariat@iupac.org and <http://www.iupac.org>

The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary non-governmental, nonprofit association of organizations, each of which represents the chemists of a member country. Its objectives are as follows:

- to promote continuing cooperation among the chemists of the member countries
- to study topics of international importance to pure and applied chemistry which need standardization or codification
- to cooperate with other international organizations that deal with topics of a chemical nature
- to contribute to the advancement and understanding of pure and applied chemistry in all its aspects

The membership of IUPAC currently comprises 45 national organizations.

National Adhering Organizations

Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Österreichische Akademie der Wissenschaften (**Austria**)
Nationaal Comité voor Scheikunde/Comité National de Chimie (**Belgium**)
Brazilian Chemistry Committee for IUPAC (**Brazil**)
Bulgarian Academy of Sciences (**Bulgaria**)
National Research Council of Canada (**Canada**)
Sociedad Chilena de Química (**Chile**)
Chinese Chemical Society, Beijing (**China**)
Chemical Society located in Taipei (**China**)
Croatian Chemical Society (**Croatia**)
Czech National Committee for Chemistry (**Czech Republic**)
Det Kongelige Danske Videnskabernes Selskab (**Denmark**)
Academy of Scientific Research and Technology (**Egypt**)
Suomen Kemian Seura (**Finland**)
Comité National Français de la Chimie (**France**)
Deutscher Zentrallausschuss für Chemie (**Germany**)
Association of Greek Chemists (**Greece**)
Hungarian Academy of Sciences (**Hungary**)
Indian National Science Academy (**India**)
Royal Irish Academy (**Ireland**)
Israel Academy of Sciences and Humanities (**Israel**)
Consiglio Nazionale delle Ricerche (**Italy**)

Science Council of Japan (**Japan**)
Korean Chemical Society (**Korea**)
Kuwait Chemical Society (**Kuwait**)
Koninklijke Nederlandse Chemische Vereniging (**Netherlands**)
Royal Society of New Zealand (**New Zealand**)
Norsk Kjemisk Selskap (**Norway**)
Chemical Society of Pakistan (**Pakistan**)
Polska Akademia Nauk (**Poland**)
Sociedade Portuguesa de Química (**Portugal**)
Colegio de Químicos de Puerto Rico (**Puerto Rico**)
Russian Academy of Sciences (**Russia**)
King Abdulaziz City for Science and Technology (**Saudi Arabia**)
Slovak Chemical Society (**Slovakia**)
Slovenian Chemical Society (**Slovenia**)
National Research Foundation (**South Africa**)
Consejo Superior de Investigaciones Científicas (**Spain**)
Svenska Nationalkommittén för Kemi (**Sweden**)
Neue Schweizerische Chemische Gesellschaft (**Switzerland**)
Türkiye Kimya Dernegi (**Turkey**)
Royal Society of Chemistry (**United Kingdom**)
National Research Council, National Academy of Sciences (**USA**)
Union of Yugoslav Chemical Societies (**Yugoslavia**)

Chemistry in Slovenia

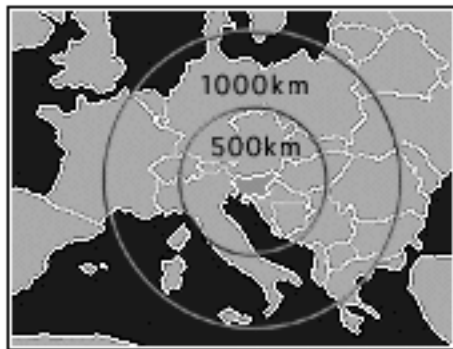
This article was contributed by Prof. Venceslav Kaucic (National Institute of Chemistry and University of Ljubljana, P.O. Box 3430, SI-1001 Ljubljana, Slovenia; E-mail: kaucic@ki.si), President of the Slovenian Chemical Society, together with Dr. Roman Gabrovsek (National Institute of Chemistry, P.O. Box 3430, SI-1001 Ljubljana, Slovenia; E-mail: roman.gabrovsek@ki.si), Research Associate, and Dr. Edvard Kobal (Slovenian Science Foundation, Stefanova 15, SI-1000 Ljubljana, Slovenia; E-mail: edvard.kobal@ustanova-szf.si), Director of the Slovenian Science Foundation.

Introduction

Slovenia's geographic and demographic area has witnessed an extraordinarily rich development of chemical knowledge, education, industry, and use of chemicals and chemical products, mainly because the region that is now Slovenia has been, throughout history, an active crossroads of different economic paths, interests, areas, specific features, and problems.

This article surveys the beginning, development, and present status of chemistry in Slovenia, encompassing the general evolution of both the chemical industry and chemical education as they have developed and grown.

Slovenia is a young Central European country; it declared its independence on 25 June 1991 after the breakup of Yugoslavia. Slovenia occupies an area of 20 256 km² and has 2 million inhabitants. The country is situated at the crossroads of four distinct geographical regions: the Alps to the north, the Pannonian plain to the northeast, the Dinaric mountain chain to the southeast, and the Adriatic coast to the south. European Union countries recognized Slovenia as an independent, sovereign state on 15 January 1992. Slovenia has been a permanent member of the United Nations since 22 May 1992, and on 6 March 1995, the European Community's



Geographical position of Slovenia in Europe.



An old-fashioned iron smelting furnace from the north-western, ore-rich region of Slovenia, where metallurgy had been in use from the 14th century to the beginning of the 20th century.

Council of Ministers granted a mandate for the beginning of negotiations on the association agreement between the European Union and Slovenia.

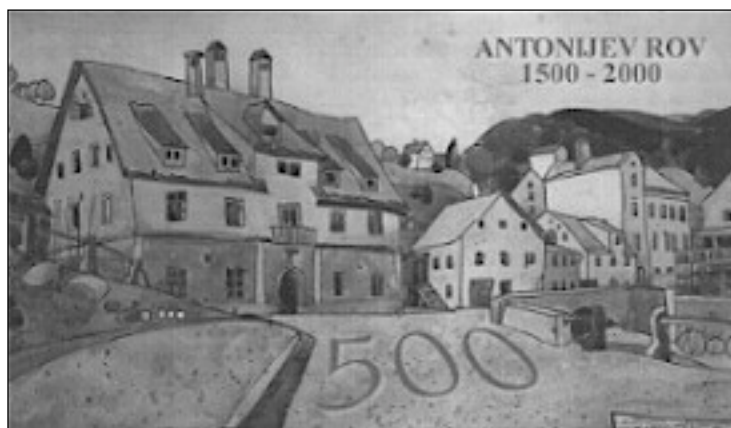
Chemistry in Pre-20th Century Slovenia

The earliest known Slovenian document, entitled *The Freising Fragments* and written in Latin script, appeared about 1000 A.D., but it was not until the 17th century that the first written text having chemistry as its subject appeared.

In the 14th and 15th centuries, as the humanist movement spread across Europe, a number of thinkers, professors, doctors, and educators of Slovenian origin were active in European universities, courts, or in diplomatic services. They were also acting as contributors in spreading information about the historical, cultural, and demographic heritage of the Slovenian nation well outside of its geographic borders.

In 1490, mercury was discovered in the town of Idrija, and the place soon became the second biggest mercury mine in the world (after Almaden in Spain). The discovery of mercury sparked considerable development of science and technology; Paracelsus, having visited the site of the mine in the early 16th century, started to exploit mercury systematically as a medicine. Scientists, mainly geologists and physicians, frequently worked in the area from the second half of the 18th century on, and they communicated their findings about

its geological and technological features throughout Europe. As a consequence of these intensive investigations, a School of Metallurgy and Chemistry was established in Idrija in 1769. (The school contributed significantly to the advancement and use of modern geological approaches to mining for the next 200 years. After World War II, geologist Ivan Mlakar made a highly original study of the complicated geological deposits of Idrija and established the internationally renowned Idrijan Geological School.)



Antonij's shaft, a visitors' entrance to the underground of the world's second largest mercury mine in Idrija.

Chemical education in Slovenia was at that time at its very beginning. The first teacher of chemistry was Baltazar Hacquet, who worked from 1782 to 1787 at the Medico-Surgery Lycée in Ljubljana. At the beginning of the 19th century, chemistry became one of the subjects taught at the Central School (renamed the Academy in 1811) in Ljubljana. Through the end of the 19th century, chemical education prospered further. Textbooks were issued; systematic chemical education was established; and papers on chemical elements, their symbols, and properties appeared. In 1898, the Agricultural-Chemical Experiment Station was built.

During the 19th century, other notable discoveries and advances were connected with the Slovenian region. Jozef Stefan, director of the Physics Institute in Vienna, Austria, discovered the law of radiation, and Austrian geographer Adolf Schmidl established speleology as a new scientific discipline on the basis of his research on phenomena in Slovenian karst caves. The most important karst topography phenomena include formation of sinkholes and caves in the barren, rocky limestone-based ground; presence of underground rivers; appearance and/or disappearance of surface streams; and absence of permanent surface rivers, streams, and lakes.

During the 19th century, chemical industry witnessed its first stage of industrialization without much signifi-

cant growth or expansion. It produced mostly basic chemical products, among them soaps, candles, sulfuric acid, and potassium nitrate; there were also some refineries for mineral oils. There were specific factories producing synthetic resins; lacquers and paints (Color, Medvode); zinc from zinc ore (Cinkarna, Celje); black powder (the chemical industry of Kamnik); coatings (Jub, Dol near Ljubljana); and washing powder, cleaning agents, and cosmetics (Zlatorog, Maribor; now Henkel Slovenija).

Early 20th Century Slovenian Chemistry

Chemical Industry

Before the beginning of World War I, several chemical industry factories had been built for production of aluminum oxide (Kemirna tovarna Moste), cosmetics, cleaning agents and candles (Ilirija-Vedro, Ljubljana), and for food processing and production (Kolinska, Ljubljana).

In the era between the two world wars, the Slovenian chemical industry experienced a rapid period of growth. During this expansion, factories were established for the production of carbides, ferroalloys, and synthetic fertilizers (Tovarna dusika Ruse);

rubber, leather, and chemical products (Sava, Kranj); chemical, graphics, and paper industry (Aero, Celje); and insulating materials (Izolirka, Ljubljana).

The beginning of World War II put an end to the expansion and growth of the chemical industry in Slovenia. The majority of factories were taken over by the German army, and their industrial processes were channeled into the manufacture of military-specific products.

Chemical Education

In 1910, the first chemistry textbook in the Slovenian language, *Chemistry and Mineralogy* by Baltasar Baebler, was printed.

In 1919, the University in Ljubljana was established. The first professors of chemistry at the university were Maks Samec and Marius Rebek. They started lecturing in 1919–1920 at the newly established Institute of Chemistry. Maks Samec was a well-known chemistry teacher and the author of three German-language books and one English-language monograph on colloid chemistry of starch and cellulose.

Postwar Chemistry in Slovenia

After the end of World War II, most of the industrial infrastructure of Slovenia needed considerable repair and/or modernization. In addition, new factories were



The main building of the University of Ljubljana, erected in 1902.

built, mostly in the areas of fertilizers, pesticides, specialty chemicals, melamine- and urea-based resins, hydrogen peroxide and sodium perborate, surface protection coatings, and special additives for the textile and leather industries. The two largest pharmaceutical companies, Lek (Ljubljana) and Krka (Novo mesto), were also built during this period, in 1946 and 1954, respectively. The economy, and especially the chemical industry, developed rapidly, assuming in the mid-1950s an entirely new appearance and reaching for new markets. The chemical industry as a whole became a leading branch of the economy.

From the 1950s on, more new factories were built, including those for production of organic acids, synthetic fibers, plastics, adhesives, and cement.

According to 1997 data from the Chamber of Commerce and Industry of Slovenia, the chemical and rub-



The pharmaceutical company Krka, located amid the green scenery of the Dolenjska region, near the beautiful Krka River.

ber industry represented 14.9% of the total Slovenian industrial turnover, 9.8% of the total industrial labor force was employed in the chemical and rubber industry, and their contribution to the added value of Slovenian industry amounted to 18.2%.

University Study

Chemical education, particularly at the university level, also felt the aftermath of World War II. There were only ten professors, four assistant professors, and eight assistants for chemistry teaching after the war ended. The governmental initiative in 1953–1954 reorganized all faculties back into one unit under the management of the University of Ljubljana. The situation then remained unchanged until the beginning of the 1960s with the same curriculum—ten semesters of study and an average of 240 students per year.

At the beginning of the 1960s, two new initiatives were launched that significantly changed the organization and scope of chemical education. First, the government passed a law establishing a three-level higher education system consisting of two-year education, full undergraduate education (four-year study), and postgraduate education (additional two-year study). Second, the university itself proposed a plan for combining science and technology as closely as possible. The result of the latter initiative was the establishment of the Faculty of Natural Sciences and Technology, within which the chemistry department consisted of four divisions: chemistry, chemical technology, textile technology, and pharmacy.

School reform at the beginning of the 1970s considerably changed the dynamics and curriculum of university studies. Organized study of chemical sciences (chemistry and chemical technology) lasted for four years, and students could benefit from another full “student-status” year. In the third year of study, students could decide on signing up for courses in either chemical technology or chemical and process engineering. The four-year curriculum also incorporated specialized study of chemical education, intended primarily for future high school teachers.

At the beginning of the 1990s, as a direct consequence of the implementation of the *matura* (secondary school graduation) exams, the Ministry of Education and Sport divided university studies into two significantly different parts. Options now included a four-year period of study leading to a university degree (B.S.), as well as a three-year curriculum leading to a specialized vocational degree.

In 1991, the Faculty of Natural Sciences and Technology split into several independent faculties, among them a newly established Faculty of Chemistry and Chemical Technology.

With the recent intention of Slovenia to join the

European Union, the European Credit and Transfer System (ECTS) was adopted. The ECTS enables the free flow of post-second-year students in any of the European universities that have signed mutual bilateral agreements.

The Faculty of Chemistry and Chemical Technology in Maribor was established in 1995 under the Act that reorganized the University of Maribor, although the study of chemistry had its roots already back in 1959 with the Technical High School. Through the years, chemical education expanded and reorganized several times, and today the study of chemical technology forms the main course taught at the Faculty. There is also the Institute for Chemical Research, which comprises eight laboratories.

The Faculty of Environmental Sciences was established in Nova Gorica in 1995 by its cofounders, the Jozef Stefan Institute of Ljubljana and the city and community of Nova Gorica. The institution was reorganized and renamed Polytechnic of Nova Gorica in 1998. Post-graduate studies of interdisciplinary environmental sciences and economy engineering, along with the school of applied natural sciences, form the backbone of comprehensive studies supported by research laboratories, libraries, and the Technology Park of the Primorska region.

Research Work—Its Development, Importance, and Achievements

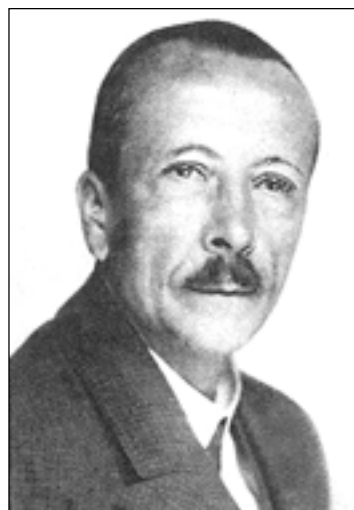
After the University was founded in Ljubljana in 1919, its first well-known chemistry professors were Maks Samec and his colleague Marius Rebek.

During his long academic career in the chemical sciences, Maks Samec, the founder of modern chemical



Maks Samec, well-known teacher and scientist, founder of modern chemical science in Slovenia, and driving force for establishment of the Slovenian Chemical Society.

science and the university study of chemistry in Slovenia, initiated the establishment of the Chemical Laboratory under the auspices of the Slovenian Academy of Arts and Sciences in 1946. Later on, the Chemical Laboratory was transformed into the Institute of Chemistry, which quickly became the central institution for chemical research in Slovenia. Samec also assisted in the establishment of the Slovenian Chemical Society, for which he was a leading force. He was recognized worldwide in the chemical profession for his achievements in the colloid chemistry of starch and cellulose.



Frederik Pregl, the only Slovenian scientist ever to have received a Nobel prize in chemistry.

The only Slovenian scientist ever to have received a Nobel prize in chemistry was Frederik Pregl (1869–1930). A physician by profession, he became head of the Medical-Chemical Institute in Graz, Austria in 1913. A year later, he received Liebig's prize in recognition of his development of methods in organic microanalysis. He further developed and popularized these methods, which brought him the Nobel prize in 1923.

Two nonprofit institutions, the Jozef Stefan Institute and the National Institute of Chemistry (both located in Ljubljana, the capital of Slovenia) also perform leading research in chemistry. Besides basic and applied research, both institutes also perform target-oriented specialized research and development studies, mostly as projects stemming from collaboration with Slovenian industry. An important function of the institutes is their approach to the education of graduate and postgraduate students. Both institutes are internationally recognized and maintain extensive contact and collaboration with universities and other institutes worldwide.

Establishment, Role, and Status of the Slovenian Chemical Society

The Slovenian Chemical Society was established in Ljubljana in 1951. It unites specialists in all fields of chemistry, chemical technology, and chemical engineering, and its goals are as follows:

- to enhance progress in all fields of chemistry, exchange experience, and popularize achievements;
- to enhance professional knowledge of its members;
- to connect its members via organized activities; and
- to establish contacts with other organizations that are active in the field of chemistry.

Today the Slovenian Chemical Society has 1300 members. It is managed by a Board that is elected for a four-year term at the annual meeting. The executive body of the Board is the Executive Committee, which consists of the president, two vice presidents, two secretaries, and the treasurer.

The Society encompasses a Division of Chemistry and a Division of Chemical Engineering and Technology. Two branch offices of the Society are active in the Dolenjska region and in Maribor. These units are managed by committees whose presidents are also members of the Society's Board.

Supervision of the work of the Society's bodies is performed by the Supervisory Committee. The Code of Ethics Committee is called in to act in cases of violation of the Professional Code of Ethics.

The Slovenian Chemical Society publishes its own quarterly periodical, *Acta Chimica Slovenica*, which contains original scientific papers; survey papers on the activities of research groups; reports on investments and industrial achievements; Society news; book reviews; reports on B.S. degrees, M.S. theses, and Ph.D. dissertations from both Slovenian universities; and agendas of scientific and specialized events at home and abroad. *Acta Chimica Slovenica* is edited by an International Editorial Board, and all published papers have been internationally refereed. The publication has been indexed in *Chemical Abstracts*, *Current Contents*, and *Science Citation Index*.

The Society cooperates with national and foreign

institutions, aside from being a member of the Federation of European Chemical Societies (FECS), IUPAC, the European Federation of Chemical Engineering (EFCE), and others.

Activities of the Society are carried out via ten sections, two committees, and two regional branches.

Membership in the Society is open to any person with a professional qualification in the chemical sciences at all levels of education, to practitioners in the chemical sciences, and to students. Conditions of membership include membership dues and agreement to abide by the Statutes of the Society and to adhere to the Professional Code of Ethics.

The Slovenian Chemical Society can nominate Honorary or Distinguished Service members in recognition of their outstanding contributions made to the promotion of the Society.

Primary tasks of the Committee for Chemical Terminology and Nomenclature are to monitor the development of Slovenian chemical terminology and nomenclature, and to cooperate with the Technical Committee of the Section for Terminology Dictionaries at the Institute for Slovenian Language (Fran Ramovs) of the Slovenian Academy of Sciences and Arts in preparing the third edition of the General Technical Dictionary. The aim of the Committee is to establish a terminology bulletin board where researchers from different fields of science would participate with suggestions for new Slovenian terms from their disciplines. This bulletin board would also enable researchers from other disciplines to contribute their own suggestions and comments with a view toward introducing and disseminating Slovenian chemical terminology.

Slovenian Chemical Days

Slovenian Chemical Days is the annual convention of chemists and chemical engineers that has taken place in Maribor every September since 1995. This convention is the meeting place for practitioners, users, and allied professionals from all areas of the chemical and process industries. Scientists from other countries also participate in this traditional event.

News from IUPAC

A Strategy for Educational Policy

The first two-day meeting of the ad hoc IUPAC Education Strategy Development Committee (ESDC) was held 20–21 February 2000 at the Royal Institution in London. Among the members of the committee, only one was unable to attend; in addition, Prof. Joshua Jortner, IUPAC's immediate past president, was present for the first day of the meeting. The ESDC Chairman, Prof. P. W. Atkins (Lincoln College, Oxford, England, OX1 3DR, UK; E-mail: peter.atkins@lincoln.ox.ac.uk), has provided the following letter addressed to IUPAC members and readers of *Chemistry International*. Please pass it along to your colleagues who may have an interest in educational matters.

The IUPAC Committee on Teaching of Chemistry (CTC) has had a long and honorable history under a sequence of inspired and enthusiastic chairmen. It has done notable work in fields springing from its original interests, which lie in the general domain of secondary education, and its work has been extended to include tertiary education. Its notable successes lie in its contribution to the furthering of chemistry education in de-

veloping countries, with its provision of access to inexpensive equipment, small-scale procedures, and printed resources.

Readers of *Chemistry International* will have seen (in the March issue) that as part of its general strategic development, the Bureau has decided that the time has come for IUPAC to examine its educational role, and particularly the role of the CTC, in the modern world, to encourage the CTC to broaden its horizons, to engage in a wider range of activities, and to consider its direction anew. To that end, it has set up a committee, the Education Strategy Development Committee (ESDC), under my chairmanship. The members of the committee come from a wide range of countries and represent a variety of interests. The terms of reference of the ESDC can be found on the IUPAC web site and were published in *Chemistry International*. Broadly speaking, they encourage the committee to carry out a root-and-branch analysis of the current structure of the CTC and other contributors to the educational program of IUPAC, and to look for imaginative ways to extend its reach. In particular, the ESDC is asked to consider how to incorporate into IUPAC's activities support for



ESDC Committee in front of the statue of Michael Faraday at the Royal Institution in London. Front row (left to right): N. Craig (USA), K. Powell (New Zealand), B. M. Abegaz (Botswana), F. Meyers (IUPAC Secretariat), N. Tarasova (Russia), P. W. Atkins (Chairman, UK), J. Jortner (IUPAC Past President, Israel). Back row: J. Poe (Canada), D. Balasubramanian (India), J. Bradley (South Africa), J. de Paula (USA/Brazil), L. Sydnes (Norway).

the public understanding of chemistry.

So far, the ESDC has had one meeting (at the Royal Institution in London, arguably the historical origin of public understanding of chemistry). It quickly became clear at the meeting that there was one task we had to do if we were to compile a worthwhile report—we had to discover what the members of IUPAC wanted. There are already numerous educational initiatives underway throughout the world, and the ESDC wanted to avoid replication, inappropriate expenditure of effort, and—to express it directly—the treading on of toes. What is there special about IUPAC that can lead it to make a useful, effective, and welcome contribution to chemical education throughout the world? Which of its current activities are wasteful of volunteers' enthusiasm and effort?

In an attempt to gather our stakeholders' views, I have written to a large number of organizations. However, I know that lurking in the world are numerous good ideas. I am, therefore, using the pages of this news magazine to encourage anyone who has a view to write to me. I am particularly interested in imaginative *global* visions. An idea for developing an inexpensive synchrotron storage ring, reusable litmus paper, or whatever, can wait until the newly constituted CTC (if that is our recommendation) is in place; what the committee seeks are *strategic* ideas. Where should IUPAC's educational effort be directed? Where is its current effort wasted? How can it best reach the people who will benefit from its activities? How can IUPAC's activities mesh helpfully and constructively into the infrastructure of national and individual initiatives? Where should it step aside? Where would it be most welcome? Is there a role for IUPAC in contributing to the public understanding of science? How do we deploy the new media? What new media should we anticipate?

In considering these questions (and others like them), we have in mind two sets of slices through our stakeholders. One set divides our constituency into three horizontal bands: secondary education, tertiary education, and the general public (to cover public understanding of chemistry). The second set divides our domain into the developed world, the developing world, and global issues. We are aware, for instance, that in some developed countries, there is a worrying drift away from science and from chemistry in particular. In developing countries, the principal object of concern is perhaps the expansion of the technological base through education. The most obvious global issues are the protection and reclamation of the environment and the encouragement of sustainable development. Views on any aspect of our task—or entirely different ways of approaching the problem—would be most welcome.

The committee is already working hard on a number of issues that we have identified. It will meet again in July, when we hope to be able to work toward com-

piling at least an interim report. That report will be infinitely more valuable if it includes ideas that reflect what the world really wants rather than what we think it needs. Please write to me or pass on your comments to other members of the committee (see the web site) by the end of May 2000.

Report on FAO/IAEA/AOAC International/IUPAC International Workshop on Principles and Practices of Method Validation, 4–6 November 1999, Budapest, Hungary

Dr. Ales Fajgelj [Quality Assurance Supervisor, International Atomic Energy Agency (IAEA) Laboratories, A-2444 Seibersdorf, Austria; E-mail: A.Fajgelj@iaea.org], Chairman of the IUPAC Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories, and Dr. Árpád Ambrus (FAO/IAEA Training and Reference Centre for Food and Pesticide Control, FAO/IAEA Agriculture and Biotechnology Laboratory, P.O. Box 100, A-1400 Vienna, Austria), Chairman of the Scientific Committee, have submitted the following report:

This workshop resulted from the internationally recognized fact that full method validation carried out through an interlaboratory method performance study is an expensive but also a limited exercise. It is impossible to organize interlaboratory studies for all analytical methods in use for determination of analytes in various analyte/matrix combinations. A formal basis for the organization of the workshop was provided by the following:

- Recommendations of the FAO/IAEA Consultants Meeting on Validation of Analytical Methods for Food Control, IAEA, Vienna, 1997,
- IUPAC Project 5/97/8, "Protocol for In-House Method Validation" (Coordinators: R. Wood, M. Thompson, and A. Fajgelj), and
- IUPAC Project 5/2/99, "Preparation and Harmonization of Internationally Harmonized Guidelines for In-House Method Validation" (Coordinators: A. Fajgelj and A. Ambrus).

In all three cases, in-house method validation (single-laboratory method validation) is scientifically and technically presented as an alternative to current internationally accepted method validation practices, namely interlaboratory method performance studies. In-house method validation is described in the IUPAC, AOAC International, and ISO guidance developed in 1988.^{1,2} In this respect, the present workshop might be seen as an important event because it actually discussed and established technical guidelines to be followed within

a single laboratory performing method validation. The process makes it necessary to elaborate all technical details; to change the philosophy and, consequently, the international legislation may take some years. In this process, the present workshop was an important milestone.

The aim of the workshop was to bring together scientists and representatives of different agencies, governments, standardization organizations, and accreditation bodies involved in method validation in general or in the acceptance of analytical methods for legislative purposes. Around 120 participants from 34 countries attended the workshop. International organizations [AOAC International, Food and Agriculture Organization of the United Nations (FAO), IAEA, IUPAC, European Commission, EURACHEM, etc.] were also formally represented. Fourteen participants received IUPAC financial support to attend the meeting, and they all actively participated in preparation of the workshop documents or delivered a presentation (oral or poster).

The first day of the workshop was dedicated to presentations (lectures and posters), while on the second day two draft documents were introduced and explained. Both of these documents are available upon request of the following titles:

- *IUPAC Harmonized Guidelines for In-House Validation of Methods of Analysis* (Technical Report), prepared by R. Wood, M. Thompson, and S. Ellison; and
- *Practical Procedures to Validate Method Performance and Results of Analysis of Pesticide and Veterinary Drug Residues, and Trace Organic Contaminants in Food*, a discussion document, prepared by Á. Ambrus, FAO/IAEA.

The third day of the workshop was dedicated to general discussion regarding the quality requirements to be met when analytical methods are validated and specifically to comments and recommendations regarding the two draft documents presented. For logistical reasons, the discussion focused principally on methods for pesticide and veterinary drug residues and for trace organic contaminants in food. In these fields, the use of standardized methods has a strong legislative basis. Nevertheless, the single-laboratory method validation approach is also important for all other analytical methods. In this respect, specific guidance on minimum quality criteria and other requirements will need to be prepared.

Major topics related to validation and subsequent use of analytical methods discussed at the present workshop included the following:

- IUPAC “harmonized guidelines”,
- “practical procedure”,
- proficiency testing,

- use of collaboratively studied methods,
- uncertainty of analytical measurement, and
- role of level of detection/level of quantitation (LOD/LOQ).

The following recommendations resulted from the workshop.

IUPAC “Harmonized Guidelines” for In-House Validation of Methods of Analysis

- The term “single-laboratory validation” is preferred to “in-house validation”.
- Validation criteria recommended should be the minimum necessary to assure method performance for the intended purpose.
- A single-laboratory validation cannot assess between-laboratory variation and will provide an optimistic assessment of interlaboratory variability.
- Quality control (QC) procedures should be used within a laboratory to monitor ongoing conformance to the performance characteristics estimated during validation. These results can be used to refine the estimated performance characteristics of the method.
- Participation in interlaboratory studies enhances method validation and supports comparability of analytical results.
- Analysis of fortified test portions provides an estimate of precision and bias of the analytical method.
- Analysis of samples containing incurred residues provides an estimate of analyte homogeneity after sample processing.
- Where certified reference materials containing incurred residues are not available, determination of efficiency of extraction is beyond the capability of most laboratories.
- Laboratories should agree with clients on method performance to be achieved, including reporting limits.

The basic concept of the document and the approach of in-house method validation based on evaluation of uncertainty sources associated with each specific analytical method were largely accepted, and after revision the document will be sent to IUPAC, AOAC International, International Organization for Standardization (ISO), EURACHEM, and Cooperation on International Traceability in Analytical Chemistry (CITAC) for endorsement. Its publication in *Pure and Applied Chemistry* is expected at the end of 2000, but this document will not represent the end of the complete process. The adoption of this new approach in laboratories and its acceptance by legislative authorities will require some more time.

“Practical Procedure”

In addition to the “harmonized guidelines” and the comments given above, the following points are to be considered by FAO/IAEA expert consultation regarding the “practical procedure”:

- The redraft should contain a generic approach to single-laboratory method validation for organic trace analysis.
- Specific aspects relating to pesticide and veterinary drug residues will be contained in appendices.
- The minimum list of analytes will be reconsidered to determine the most appropriate analytes to be included in multiresidue method validation (e.g., compounds that have caused problems in trade).
- The following issues should be considered within the context of the intended use of a method: parameters to be studied, criteria to be used, and number of determinations required to meet criteria.
- The terminology used in the document should be consistent with Codex, ISO, and IUPAC terms, insofar as practical.
- “Practical procedure” is subject to further elaboration by the expert group of the FAO/IAEA. Publication of the document is foreseen during the first half of 2000.

Proficiency Testing

- The “International harmonized protocol for proficiency testing of (chemical) analytical laboratories” defines the criteria for design and evaluation of proficiency tests.
- The participants raised some general concerns regarding the use and interpretation of proficiency test results and requested that these concerns be brought to the attention of accreditation authorities. These items were not intended for inclusion in either the “harmonized guidelines” or the “practical approach” final documents.
- Properly designed proficiency tests can provide information to reduce the necessity for collaborative studies of methods. If laboratories can demonstrate accurate measurement of test analytes in common samples, acceptable method performance and equivalency of methods can be inferred.
- Proficiency testing and QC are distinct procedures and cannot take the place of each other.
- Proficiency test samples should represent the types of samples encountered in actual practice, to the extent that is possible and practical.
- The scale of proficiency testing should be cost-effective for each participating laboratory.

- Coordination of national testing plans or sample exchange schemes can provide a greater range of samples and analytes for proficiency testing. Such coordination is encouraged.
- Careful evaluation of proficiency tests is required to minimize the possibility of misinterpretation of results. It is critical that the limitations of proficiency testing be recognized because registration and accreditation organizations may use results as criteria of laboratory credibility.

Use of Collaboratively Studied Methods

Collaboratively studied methods should be used when such methods are already available, suitable for the purpose intended, and required by clients or regulations.

Uncertainty of Analytical Measurement

- A clear and unambiguous definition of uncertainty of measurement in analytical chemistry is needed.
- Well-defined practical methodology is needed on how to develop meaningful data to assess uncertainty in trace analysis.
- It is especially important that the lay public and laboratory clients understand what uncertainty *means* and *does not mean* in analytical measurement.
- Measurement uncertainty should be estimated, if required, and be available to clients.

Use of LOD/LOQ

LOD and LOQ are variable estimates, the values of which depend on the conditions of measurement and the experience of the analyst. The use of these estimates in client reports can be misleading. In view of this problem, participants requested that the FAO/IAEA expert consultation following the workshop consider, as an alternative, that the lowest calibrated level of the analysis be used in client reports.

Proceedings of the workshop, including most of the presentations (lectures and posters) will be published in a special proceedings series book by the Royal Society of Chemistry (RSC) during the first half of 2000 and can be ordered directly from the RSC.

The decision of the local organizers at the Plant Health and Soil Conservation Station of Budapest to hold the workshop in the amenable environment of the Hungarian Academy of Sciences resulted in three intensive and productive days of meetings.

¹W. Horwitz. *Pure Appl. Chem.* **60**, 855–867 (1988).

²W. D. Pocklington. *Pure Appl. Chem.* **62**, 149–162 (1990).

Report on ICSU/IUPAC Southeast Asian Workshop on Molecular Basis of Biodiversity: Conservation and Sustained Innovative Utilization, 26–28 November 1999, Bangkok, Thailand

Prof. Dr. Yongyuth Yuthavong [Director, Thailand Graduate Institute of Science and Technology (TGIST), National Science and Technology Development Agency (NSTDA), 73/1, Rama VI Road, Rajdhevee, Bangkok 10400, Thailand; E-mail: yongyuth@nstda.or.th], Provisional Member of the IUPAC Organic and Biomolecular Chemistry Division (III) Committee and Member of the Subcommittee on Bioorganic Chemistry, has submitted the following report:

Thirty-seven participants from Southeast Asia (China, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam) and Europe were invited to this workshop, which was jointly organized by the International Council for Science (ICSU); IUPAC; the United Nations Educational, Scientific, and Cultural Organization (UNESCO); and the National Center for Genetic Engineering and Biotechnology (BIOTEC)/NSTDA.

Program

The program at the Siam City Hotel in Bangkok consisted of the following activities:

Keynote Addresses

- “Global risk/benefit sharing in pharmaceutical innovation”, A. E. Fischli, IUPAC
- “Biotechnology–biodiversity, two sides of the same coin: A Thai context”, S. Bhumiratana, Director of BIOTEC
- “Role of international networks in cooperative research and development”, D. StC. Black (Australia)

Discussion

- Bioresources: “To share or not to share”, led by Y. Thebtaranonth (Thailand)
- Biodiversity: “Enhancing biodiversity value for securing future human needs”, led by S. Sastrapradja (Indonesia)
- Biodiversity: “International perspectives on biodiversity, conservation, and sustained innovative utilization”, led by J. A. McNeely (Switzerland)
- Bioresources: “Recommendations for future cooperation”, led by Y. Yuthavong and A. E. Fischli

Field Trip to “Five-Province-Junction” Forest, Chacheongsao

- “Introduction to Khao Ang Ru Nai Wildlife Sanctuary”, T. Prayurasiddhi (Thailand)

- “Study of Biodiversity in Khao Ang Ru Nai Wildlife Sanctuary Nature Trail”, led by T. Prayurasiddhi and P. Polsena, Natural Resources Conservation Center, Royal Forest Department (RFD)

Recommendations Document

The workshop resulted in the drafting of the following Recommendations for Global Cooperation on Sustainable Prospecting for Molecular Systems and Information at the Molecular Level from Natural Resources:

Introductory Remarks

Biodiversity is a complex issue requiring global coordinated attention from various fields of the physical, biomedical, and social sciences. One salient aspect of biodiversity is chemical in origin. The unique and diverse molecular libraries provided by the planetary flora and fauna have been a source of immense practical value to mankind. As a corollary, bioresources serve as a treasure house of as yet to be identified molecular templates whose potential significance cannot be conceived at the present time. This treasure must be held in trust for future generations.

Different parts of the globe have different degrees of complexity of their biological resources. International cooperation is, therefore, required to ensure that the benefits of global bioresources can be equitably and fairly distributed. Not all regions are in an ideal position today to obtain the maximum benefit from those assets. The necessity for mutually advantageous global cooperation in the utilization of bioresources is obvious. An essential element of such a common effort is the equitable benefit-sharing between the partners. This topic was the subject of several declarations [including the Manila Declaration (February, 1992); the Bukit Tinggi Declaration (October, 1992); the Melaka Accord (June, 1994); and the Phuket Declaration (November, 1997)]. It was also addressed on a broader international level at the United Nations Conference on Environment and Development in Rio de Janeiro in June, 1992, and it has been enshrined in international law through the Convention on Biological Diversity.

Innovative utilization of bioresources links society, governments, academia, and industry. They are the main stakeholders in both the preservation and utilization of bioresources, investing in and, at the same time, benefiting from the products and services originating from those assets. Any activity that adds value to a biological resource can help to support its conservation by making its sustainable use more relevant to society, and increasing public awareness of this relationship should be promoted. Because molecular systems or information at the molecular level is used in the chain of value enhancement, the chemical community is called upon to contribute to the discussion of the various scientific, economic, and ethical issues that are associated with

this type of international cooperation. To this end, IUPAC, the only independent global association of scientists responsible for chemistry, can and must play a crucial role in developing suitable recommendations [see IUPAC Recommendations on the Preservation of Natural Biodiversity in Context of Search for Economically Valuable Medicinal Biota, *Pure and Applied Chemistry*, Vol. 68, No. 12, pp. 2325–2332, 1996]. This effort should be carried out in close collaboration with the International Council for Science (ICSU).

Aspects of Global Cooperation

Three overlapping areas of international cooperation can be distinguished:

- exchange and generation of new scientific knowledge, resulting finally in rapidly published data accessible to everybody at no cost (academic exchange),
- selection of new knowledge generated, which by decision of the parties involved must be protected by patents prior to eventual later publication (early steps in innovation), and
- cooperation of partners focusing on the development of new products or services with an expected economic output (commercial cooperation).

It is important to emphasize at the outset, that in developing international guidelines for cooperation, an approach that is anchored in the recognition of mutual interest and mutual trust is absolutely essential. Personal collaboration is essential for teaching and research, and should be facilitated. The truism that we live in a global village is certainly valid in this context. Working together for the benefit of society and the environment must be the main objective of all parties. Once the basic common values are recognized, the first step in initiating the process toward formulating any guidelines requires the assemblage of parameters that define the authority, interest, investments, and obligations of the interacting partners. Subsequently, a phalanx of parameters should be identified that will constitute the functional framework acceptable to either side. Whereas ICSU/IUPAC have the mandate and responsibility to furnish the stakeholders with scientific input and the proposed form of any recommendations, legislative aspects must be addressed by appropriate governmental bodies.

Recommendations

Preamble

The parties involved

- recognize the sovereign rights of states over their own natural resources and the authority of national governments to determine access to biological and

genetic resources, subject to national legislation;

- are dedicated to the conservation of biomolecular resources for future generations;
- recognize the vital role of science worldwide in education, research, and innovation;
- recognize the contributions that the molecular diversity of natural products from the biome have made to the health and welfare of humankind;
- affirm their commitment to cooperate fairly and equitably with stakeholders for the benefit of humankind in the sustainable utilization and development of biomolecular resources;
- acknowledge the interests of other stakeholders from the country or from abroad, including indigenous and local communities and farmers, in natural and genetic resources and associated information;
- are determined to honor the spirit of international, regional, national, and subnational laws and policies concerning biological and molecular diversity;
- are committed to ensure fair and equitable sharing of benefits arising from the sustainable utilization of natural resources;
- are dedicated to the fostering of research, accumulation, and dissemination of knowledge at the molecular level; and
- are dedicated to the enhancement of the scientific and technological expertise and resources of less-developed countries.

The parties have agreed to the following guidelines.

Authorization

- All academic exchange, cooperative early steps in innovation, and commercial cooperation have to be conducted under the auspices of appointed authorities.
- All countries should facilitate the rapid and efficient formulation of contracts between interacting partners.

Interests

- Academic interaction is directed at generating fundamental scientific knowledge in the first instance. Such basic knowledge may be translated into commercial products and services when this process becomes economically beneficial.
- There is a genuine interest of all partners in the translation of scientific knowledge into commercially viable products and services, and in the equitable sharing of benefits ensuing from them.
- Commercial cooperation aims to develop marketable products and services and to guarantee an optimal return on investment.
- All cooperating partners desire fast and simple regulations that govern activities of their common undertaking. A slow and complex bureaucracy would negatively influence cooperation.

- Bioresource-rich countries have an interest in enhancing their technical training and improving their facilities, as well as in ensuring the sustainable management of their natural resources and harnessing biodiversity for economic development.
- Partners from regions with advanced technology are motivated by the search for novel molecular structural templates, the underlying biomolecular chemistry, and the development of their economic potential made available by the partnership.
- All partners should appreciate each other's genuine interests and work in a spirit of mutual understanding, common accountability, and trust.

Investments

- Authorities in bioresource-rich countries should invest in infrastructure facilitating the emergence of small- and medium-sized R&D enterprises (SMEs), as they will become the potential main business partners of global innovation.
- Bioresource-rich countries offer the biota within their jurisdiction for scientific investigation. They also contribute traditional information on empirical correlations between biocomponents and their potential use.
- The partners from countries with advanced technology provide modern technical expertise for the isolation, identification, evaluation, and eventual generation of molecular libraries of biocomponents judged to be of value. They are bringing in their share of financial commitment as well, from both private and public sources.
- Bioresource-rich countries contribute technical manpower and field labor to the project. The technical manpower is a contributor, as well as a receiver, of enhanced technical training.
- All cooperating parties should contribute appropriately to the financial investments supporting the project.

Obligations

- The terms of any contract constitute the basis of the formal obligations for all parties.
- The partners should ensure the free flow of scientific information between themselves and with the scientific community. They should collaborate in the publication of scientific results, if needed, after due protection of economic interests of any partner, and be guided by the clauses of eventual patent laws.

Benefit Sharing

- Partners will assure that the benefits arising from the utilization of bioresources are shared fairly and equitably.

This workshop is part of the ongoing activities of the IUPAC Division III project "Molecular Basis of Biodiversity: Conservation and Sustained Innovative Utilization" (Project Leaders: A. E. Fischli and U. K. Pandit).

Report on International Bureau of Weights and Measures (BIPM)— Consultative Committee for Amount of Substance (CCQM) Working Group Meeting and Workshop on Measurement Uncertainty, 29 November–3 December 1999, Paris, France

Dr. Ales Fajgelj [Quality Assurance Supervisor, International Atomic Energy Agency (IAEA) Laboratories, A-2444 Seibersdorf, Austria; E-mail: A.Fajgelj@iaea.org], Chairman of the IUPAC Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories, has submitted the following report:

As a successor to Prof. Folke Ingman in the position of IUPAC representative to the Consultative Committee for Amount of Substance (CCQM), International Bureau of Weights and Measures (BIPM), Paris, France, I attended a working group meeting and a workshop on measurement uncertainty held 29 November–3 December 1999 at BIPM.

General Information and Observations

CCQM is a technical committee that operates as a part of BIPM, a central international metrological organization. CCQM was established in 1993 to support the BIPM mandate in

- establishing fundamental standards and scales for measuring principal physical quantities and maintaining international prototypes,
- carrying out comparisons of national and international standards,
- ensuring coordination of corresponding measurement techniques, and
- carrying out and coordinating measurements of fundamental physical constants relevant to these activities in the field of chemical measurements.

Working Groups (WGs) carry out the technical work of CCQM. Present WGs are grouped in two fields, as follows: i) primary methods, such as isotope dilution mass spectrometry, coulometry, static and dynamic analysis of gas mixtures, titrimetry, determination of freezing point depression, and NMR spectroscopy as a

primary method; and ii) international comparisons, including key comparisons, organic analysis, inorganic analysis, gas analysis, and pH.

In one of the most important events related to international metrological harmonization in the last decade, 49 countries signed the Mutual Recognition Arrangement (MRA) in October 1999. The MRA provides a formal basis for mutual acceptance of national measurements standards and of calibration certificates issued by national metrology institutes.

To assure and demonstrate the comparability (reproducibility of measurement results) between the measurements carried out by respective national metrological institutions, many international comparisons are being organized. Each international comparison—key comparison—is first organized as a pilot study. Several metrological institutions take part in the characterization of a selected material and establish the best estimate of a “true value” for analytes of interest and a target value for the associated measurement uncertainty. Although metrological comparisons organized by CCQM are not intended for production of reference materials, the technical principles are exactly the same. For this reason, such work carried out by CCQM is of great interest to IUPAC in general and especially to IUPAC’s Analytical Chemistry Division and its Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories.

In most cases, those institutions participating in pilot studies are also the main reference materials-producing organizations, e.g., National Institute of Standards and Technology (NIST), Institute for Reference Materials and Measurements (IRMM), LGC, etc. The results of pilot studies are discussed within WGs, and all the technical reasons for eventual discrepancies are investigated before any outliers are identified and before any decision on acceptance of results is taken.

I participated in the work of the WGs on Organic Analysis and Inorganic Analysis and at the workshop on measurement uncertainty organized in the framework of this CCQM meeting. Some of the following points raised during a discussion in the WGs or at the measurement uncertainty workshop might be of interest to IUPAC members; for example:

At the WGs discussion of international laboratory comparisons:

- For complicated analyses or when the complete material has to be used, more than one sample bottle (vial) is provided to the participants. One bottle is provided for training purposes.
- There is no general guidance on how participants’ data should be statistically treated. Arithmetic mean, weighted mean, median, and total median are used

to express the best estimate of a “true value” on the basis of the organizers’ decision in each comparison separately.

- Criteria for data acceptance in international key comparisons are set up during pilot studies. They are established by a small number of laboratories (with demonstrated quality). The measurement capability of these laboratories has to be demonstrated at regular intervals (at least once per year). Pilot studies should define “what is reasonably achievable”.
- Laboratories participating in pilot studies can withdraw their data at any time. Laboratories participating in key comparisons cannot withdraw data after submission.
- Large differences in perception between the theoretical and practical approaches related to the traceability of analytical results exist even between metrological institutions.
- Problems with inhomogeneity of intercomparison samples are often observed.
- Problems with shipment of some types of materials (liquid samples on trans-Atlantic flights, customs regulations, etc.) are often reported.
- The extent of instructions given to the participants was discussed. Regardless of the instructions given, there are always some laboratories that are not following the instructions.

At the measurement uncertainty workshop:

- What are the consequences of the given mean value and associated uncertainty? In many cases, uncertainties of results reported from different laboratories do not coincide with those given as target values. Which data are still acceptable?
- How should we combine results and associated uncertainties from a single laboratory, as well as sets of data from different laboratories?

Most of the discussion points are still open questions. No general answers were provided, and there is still a lot to do in the harmonization of these open questions.

At this CCQM meeting, an important change in the perception and classification of primary methods of analysis was observed. The potential of all techniques to demonstrate traceability of measurement results obtained to the International System of Units (SI) should be reinvestigated. It was pointed out that analytical techniques could not be declared as primary *per se*. Their potential should be demonstrated for each sample/measurand/analyte/technique combination. For this reason, as a first step in this direction, an international symposium was planned for April 2000 at BIPM. In connection with the “single-laboratory method validation principle” proposed and discussed at the AOAC/FAO/IAEA/IUPAC Workshop in Budapest in November

1999 (see article on page 71), this new perception of primary methods of analysis is very promising for different analytical techniques. Being declared as primary and accepted as fully validated, analytical techniques might be applied to a wide range of analysis required for legislative and international trading purposes.

Persons Contacted

As agreed before the meeting, I had the opportunity to meet individually with Dr. Terry Quinn, Director of BIPM; Dr. R. Kaarls, CCQM President; and Dr. R. Davis, CCQM Executive Secretary.

In all cases, the importance of international cooperation in the field of chemical metrology was pointed out. The relationships between BIPM, CCQM, and

IUPAC were found to be successful. National and international needs relating to metrology are well elaborated in the report prepared by BIPM for governments of Member States of the Convention of the Metre in 1998. (Copies are available free of charge from BIPM.) It was pointed out that IUPAC input into metrology in chemistry might even be larger.

Next Meeting

The next meeting of CCQM took place 4–7 April 2000 at BIPM in Sèvres, France. It was combined with the working group meetings and with the international symposium on primary methods.

For more information about BIPM and CCQM, visit the BIPM web site at <http://www.bipm.fr/>.

Reports from IUPAC-Sponsored Symposia

4th International Symposium on Functional Dyes, 31 May–4 June 1999, Osaka, Japan

The 4th International Symposium on Functional Dyes—Science and Technology of Functional π -Electron Systems was held at Cosmosquare International Education and Training Center, Osaka, Japan from 31 May–4 June 1999 under the cosponsorship of IUPAC and the Kinki Chemical Society of Japan. This symposium followed the first symposium in Osaka in June 1989, the second one in Kobe in August 1992, and the third one in Santa Cruz, California, USA in July 1995. A total of 572 participants from 21 countries registered for the 4th symposium.

The term “functional dyes” implies “functional π -electron systems”. The objective of the symposium series has been to contribute to the progress of science and technology of this promising interdisciplinary field, combining biology, chemistry, physics, and potential technological applications, and to strengthen interactions between universities and industrial research laboratories. The symposium is intended to bring together scientists and engineers working on functional π -electron systems from all over the world to discuss potential progress that will take place in the future, as well as the problems remaining to be solved.

The scientific program symposium covered all aspects (from molecular design to device fabrication) of functional π -electron systems of current interest, e.g., biologically active substances, fullerenes, liquid crystals, supramolecules, and materials for electronic and photonic devices. In particular, the symposium focused on the functions of π -electron systems and consisted of

**THE FOURTH
INTERNATIONAL SYMPOSIUM
ON
FUNCTIONAL DYES**

**- Science and Technology of
Functional π -Electron Systems -**

**MAY 31 - JUNE 4, 1999
OSAKA, JAPAN**



Plenary manuscripts will appear in the November 1999 issue of *Pure and Applied Chemistry* (Vol. 71, No. 11, in press).

three sessions: π -electron systems with (1) biological functions, (2) chemical functions, and (3) physical functions. The symposium included 3 plenary lectures, 18 invited lectures, 3 invited talks each at the 2 special sessions on computational chemistry and advanced materials, and 275 contributed papers in either oral (48) or poster (227) presentations.

All the participants enjoyed the high scientific quality and friendly, warm atmosphere of this symposium. The symposium helped participants to gain valuable information on further potential development in this attractive interdisciplinary field through the exchange of knowledge and ideas, stimulating young research-

ers who should carry science and technology forward into the 21st century.

On behalf of the organizing committee, we wish to express our hearty thanks for the excellent contributions and the kind cooperation of all the authors.

Profs. Eiji Osawa, Yasuhiko Shirota, and Zen-ichi Yoshida

Symposium Editors of the 4th International Symposium on Functional Dyes—Science and Technology of Functional π -Electron Systems
Osaka, Japan

**IUPAC International Symposium on Ionic Polymerization (IP'99),
19–23 July 1999, Kyoto, Japan**

This symposium, held in the Kyoto International Conference Hall, was sponsored by the Chemical Society of Japan, the Society of Polymer Science of Japan, the Society of Synthetic Organic Chemistry of Japan, and the Japan Chemical Innovation Institute, in addition to IUPAC.

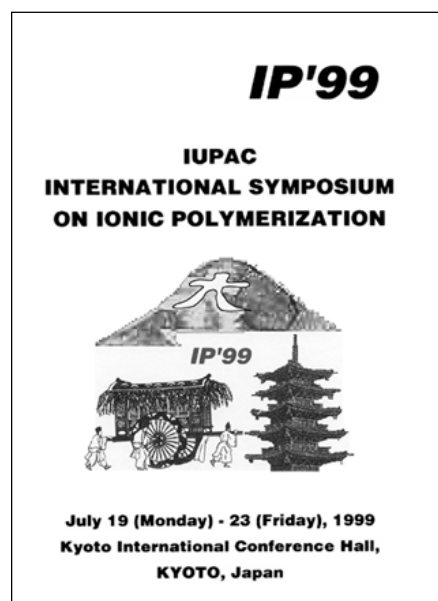
Prof. Shohei Inoue (Science University, Tokyo) was the Honorary Chairman of the symposium. Prof. Shiro Kobayashi (Kyoto University) chaired the Organizing Committee, Prof. Mitsuo Sawamoto (Kyoto University) headed the Program Committee, and Prof. Yoshiki Chujo was Chairman of the Local Committee.

The International Symposia on Ionic Polymerization have a long history. They were started in the late 1940s and early 1950s by Prof. David Pepper (Dublin, Ireland) and Prof. Peter Plesch (Keele, United Kingdom), who at that time dominated the field of cationic polymerization. Then, after the discovery of the processes of “living polymerization” by Prof. Michael Szwarc, founder and “father” of modern ionic polymerization, a series of more or less formal meetings was organized in the field of anionic polymerization. Two decades later (in 1975), I organized the first IUPAC Symposium on Ring-Opening Polymerization. Finally, the concerted efforts of a group of scientists working on anionic, cationic, and ring-opening polymerization converted these separate meetings into a chain of symposia unifying all of the fields of ionic polymerization.

The Kyoto Symposium was the third one (after Istanbul and Paris) of this new series. In attendance were more than 260 active participants, including an impressive number of younger Japanese scientists who presented high-quality lectures on the newest topics. In all, 34 invited lectures, 60 other lectures, and 61 posters were presented. Practically all of the important research centers in the field of ionic polymerization from all over the world were represented at this impressive meeting.

Lectures comparing radical and ionic polymerizations (K. Matyjaszewski) and/or enzymatic processes (S. Kobayashi) were presented, as well as other lectures on radical processes that kinetically resemble living ionic polymerization (e.g., papers by A. Matsumoto, K. Muellen, Y. Okamoto, and others). Polymerization mechanisms, macromolecular syntheses, and properties of polymers prepared by ionic and radical polymerization were also presented.

Several presentations particularly sparked my imagination, although such a selection is invariably subjective. The work of a group of authors (Percec, Barboiu, Bera, Kim, Frechet, and Grubbs) whose efforts, described by Percec, were related to the synthesis of single macromolecules of highly sophisticated, complex ar-



Proceedings will appear in a future volume of *Macromolecular Symposia*.

chitecture was achieved by polymerization of well-defined dendrimers. The lecture by Matyjaszewski (mentioned above) showed how to combine ionic and radical processes in the synthesis of block copolymers of well-defined structures. Rizzardo presented an important step forward in synthesis of macromolecules with well-defined backbones by using a novel effective chain transfer. The ingenious choice of the chain transfer agents in radical polymerization allowed preparation of a number of vinyl polymers with controlled molar masses, molar mass distribution, and end-groups. Finally, Sawamoto presented his own approach to radical polymerization mediated by transition metals. It is difficult and probably impossible to predict which of the many novel radical processes will finally emerge to be become practical and routine.

Of course, understanding of the kinetic features of the processes presented would not be possible without the accumulated knowledge from living anionic polymerization and other (e.g., ring-opening) processes where the temporarily deactivated (dormant) species coexist with instantaneously active ones in the same macromolecule over various periods of time.

In already well-established areas of anionic polymerization, several speakers (Moreau, Vairon, and others) presented striking new achievements, such as copolymerization of two aldehydes to give a much lower equilibrium monomer concentration for both comonomers than in their respective homopolymerizations. This result could be expected but it was shown for the first time in the polymerization of aldehydes, and it opened up new, interesting synthetic possibilities for this vast class of monomers.

Several impressive lectures were given by seasoned scientists (Fontanille, Sigwalt, Goethals, Mueller, Higashimura, Deffieux, Zsuga, Charadame, Faust, Aida, Kubisa, Duda, and some others), all of whom have already been contributing to their fields for several decades. However, a group of excellent younger scientists (R. Gross, Y. Chujo, and others) appeared, bringing their own views to this well-explored field.

Some participants took the opportunity to visit the Kansai Research Institute, Inc., located in Kyoto Research Park, where a large proportion of scientific activity is related to macromolecular chemistry and physics. Prof. Takeo Shimidzu, Executive Vice President of this Institute, was kind enough to describe personally the major areas of research for the IP'99 Symposium visitors. An interesting social program was also planned and carried out by the charming Miyo Kobayashi, wife of the symposium chairman.

Prof. Stanislaw Penczek
Titular Member, IUPAC Macromolecular Division
(IV) Committee
Associate Member, IUPAC Commission on
Macromolecular Nomenclature (IV.1)
Łódź, Poland

5th International IUPAC Symposium on
Bioorganic Chemistry (ISBOC-5),
30 January–4 February 2000,
Pune, India



This symposium was accompanied by a pre-symposium in Delhi on "Trends in medicinal chemistry and bio-catalysis" and a post-symposium in Bangalore on "Recent trends in

bioorganic chemistry". About 350 participants, many of whom came from outside India, attended the meeting in Pune. In total, 18 foreign countries were represented. The organizers had especially encouraged the participation of young Indian chemists, and the success of this objective was very much in evidence during the meeting.

The scientific program comprised 13 plenary lectures (some of which will appear in a future issue of *Pure and Applied Chemistry*), 38 invited lectures, 30 short presentations, and 115 posters, with emphasis on nucleic acids, nucleic acid components, peptides, proteins, enzymes, and designed synthetic receptors. The presentations illustrated the current role of bioorganic concepts in the interpretation of biological phenomena at the molecular level. Attention was also directed to the practical potential of this molecular-based approach. Several speakers made the point that organic chemistry constitutes a crucial component of the broader field of biomolecular chemistry. This view echoes the recent decision of IUPAC to expand the task and responsibilities of its Division of Organic Chemistry in the biomolecular area.

Lecture presentations at the symposium were of uniformly high standard. In addition, the meeting featured a large number of good-quality posters presented by young local chemists. These presentations demonstrated the vitality of Indian chemistry in general and the high level of interest in the field of bioorganic chemistry, in particular.

The symposium facilities were of excellent quality. All events, except for a half-day session, were organized in a luxurious hotel. This venue provided a practical opportunity for scientific interaction in a congenial environment. An interesting social program was arranged, and the participants were extended the traditional generous Indian hospitality.

ISBOC-5 demonstrated the dynamic quality of the field of bioorganic chemistry and its significant contribution to the understanding of the molecular basis of the biological sciences.

Prof. Upendra K. Pandit
Titular Member and Past President, IUPAC
Organic and Biomolecular Chemistry Division
(III)
Universiteit van Amsterdam
Amsterdam, Netherlands

New Projects

Visit <http://www.iupac.org/projects/> for complete information and further links.

Environmental Analytical Chemistry— Problems Related in Part to Mining in Africa

Chemists in the developing world are faced with globalization of the economy, and regulatory chemists and lab managers need to be aware of the latest official methods of analysis. Because Africa is engaged in many heavy mining projects, it is anticipated that at least five African countries will be involved in reviewing environmental chemistry activities related to mining. Ten officials of five different chemical societies in Africa have all stated that their largest pollution problems with air, water, food, and soil stem from mining.

IUPAC's Joint Working Party with IOCD on Environmental Analytical Chemistry in Developing Countries has developed a joint project with the International Organization for Chemical Sciences in Development (IOCD) and the host for our meeting, Prof. Dr. Ernst L. J. Breet, School of Chemistry and Biochemistry, University of Potchefstroom, South Africa, to make available the latest laboratory techniques, information, and official methodology concerning environmental analytical chemistry to African analytical and supervisory chemists.

As a part of this project, a five-day regional workshop will be held 24–29 September 2000 at the University of Potchefstroom, South Africa. This workshop will address official analytical methods for water, air, food, and soils in Africa needed for problems associated with mining and other sources of pollution. Laboratory management will also be addressed, and the approach of past successful workshops of the Joint Working Party, such as the one held on Environmental Analytical Chemistry for Regulatory Chemists and Laboratory Managers in Prague, Czech Republic 16–18 June 1999 (see report in March 2000 *Chemistry International*, Vol. 22, pp. 33–34), will be followed.

Comments from the chemistry community are welcome and should be addressed to the project coordinator, Dr. Walter R. Benson, Chairperson, IOCD/IUPAC Joint Working Party, 6209 Crathie Lane, Bethesda, MD 20816-1003, USA; Tel./Fax: +1 301 229 3913; E-mail: Wbenson270@aol.com, and to the workshop host, Dr. E. L. J. Breet, Professor of Chemistry, School of Chemistry and Biochemistry, Potchefstroom University for Christian Higher Education, Private Bag X6001, Potchefstroom 2520, Republic of South Africa NR 140, Tel.: +27 18 299 2343; Fax: +27 18 299 2350; E-mail: cheelj@puknet.puk.ac.za.

See http://www.iupac.org/divisions/current_projects/1999/6_1_99.html for project description and update.

Mycotoxin Methods for Developing Countries—Aflatoxins in Paprika, Corn, Pistachios, Peanuts, and Figs

IUPAC has approved a project to improve and validate a method based on thin-layer chromatography with prior immunoaffinity cleanup for the determination of aflatoxins in corn, peanuts, figs, pistachios, and paprika. This method is intended to be used as an alternative to high-performance liquid chromatography, especially in developing countries. For that reason, mainly laboratories from developing countries are to be involved in validating the method.

Comments from the chemistry community are welcome and should be addressed to the project coordinator, Prof. Elke Anklam, European Commission, DG Joint Research Center, Institute for Health and Consumer Protection, Food Products Unit, TP 260, I-21020 Ispra, Italy; Tel./Fax: +39 0332 785390; E-mail: elke.anklam@jrc.ei.it.

See http://www.iupac.org/divisions/current_projects/1999/6_2_99.html for project description and update.

Definitions of Terms Relating to Polymers and Functional Polymers

The chemistry of reactions and functionalization of polymers has received great attention during the last two decades. Many preparation processes of basically and industrially important reactive and functional polymers are carried out through the reactions of linear or cross-linked polymeric reactants and the introduction of reactive, catalytic, or some functional groups into polymer chains. The reactions of polymers have their specific characteristics different from those of polymerization reactions. However, clear and unified terminology has not yet been decided upon for reactions of polymers, in spite of the growing importance of the field.

IUPAC has approved a project to prepare clear concepts and definitions of general and specific terms concerning reactions of polymers and functional polymers, in order to clarify terminology in the field that results in confusion and difficulty in proper scientific and technological understanding. The preparation of definitions

is being coordinated by Prof. Kazuyuki Horie, a Titular Member of IUPAC's Commission on Macromolecular Nomenclature (IV.1), with participation of all members of Commission IV.1. Comments from the chemistry community are welcome and should be addressed to the project coordinator, Prof. Kazuyuki Horie, Department of Chemistry and Biotechnology, University

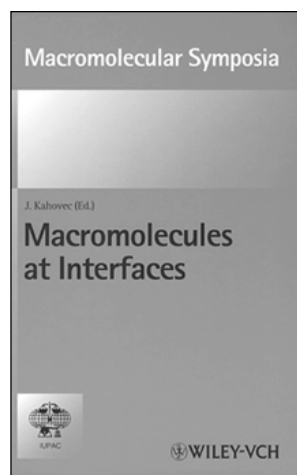
of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-8656, Japan; Tel.: +81 3 5841 7312; Fax: +81 3 5841 8658; E-mail: horie@chembio.t.u-tokyo.ac.jp.

See http://www.iupac.org/divisions/current_projects/2000/4_1_00.html for project description and update.

New Books and Publications

New Books from IUPAC

***Macromolecular Symposia, Vol. 139: Macromolecules at Interfaces.* Symposium Editor, J. Kahovec; Editor-in-Chief, Hartwig Hocker; Editors, W. Guth, B. Jung, I. Meisel, and S. Spiegel. Published by Wiley-VCH, April 1999, pp. 1–135. ISBN 3-527-29807-X (ISSN 1022-1360).**



Volume 139 of *Macromolecular Symposia* contains main and special lectures presented at the IUPAC Symposium on Surface and Interfacial Phenomena held 21–24 July 1997 in Prague, Czech Republic under the sponsorship of IUPAC's Macromolecular Division. This meeting was also the 17th Discussion Conference of the Prague Meetings on Macromolecules or-

ganized by the Institute of Macromolecular Chemistry in Prague.

***Macromolecular Symposia, Vol. 143: Macromolecules.* Symposium Editor, K. P. Ghiggino; Editor-in-Chief, Hartwig Hocker; Editors, W. Guth, B. Jung, I. Meisel, and S. Spiegel. Published by Wiley-VCH, August 1999, pp. 1–370. ISBN 3-527-29903-3 (ISSN 1022-1360).**

Volume 143 of *Macromolecular Symposia* contains plenary and keynote lectures delivered at Macro98 World Polymer Congress, the 37th IUPAC International Symposium on Macromolecules, which was held on the Gold Coast, Queensland, Australia 11–15 July 1998. One thousand and seventy-five delegates attended, plus about 120 accompanying persons. Most delegates were from outside Australia, indeed coming from 45 differ-

ent countries. The biennial IUPAC World Polymer Congresses provide a special opportunity for scientists to meet each other and to become aware of developments and progress in other countries. From these conferences, future links emerge between individuals and between organizations. The meeting was opened by His Excellency the Governor of Queensland, Major-General Peter Arnison. The Governor noted the international scientific and technical importance of the meeting, and indeed was able to draw on his own background (as former executive director of a company producing products for the mining, agricultural, transport, and local government services) to put the meeting in context. He noted the enormous number of benefits that are conferred on our everyday lives by artificial and natural polymers, in addition to the fascinating scientific challenges they present.

Invited speakers and contributed poster and verbal papers covered literally every aspect of polymer science and technology; there were a total of 1 050 papers presented in all. The program also included various symposia, not least of which was that on Polymer Science and Industry. Indeed, the first speaker after the Governor's opening, Dr. Peter Chan of Polymer Coating Technologies of Singapore, set the tone of scientific excellence and relevance, when he spoke on scientific challenges arising from new technology demands. Subsequent speakers in this symposium, which extended for two days, addressed scientific, technical, and societal issues. Other major components of the conference were the O'Donnell Symposium on Radiation Chemistry and Polymers, and the Symposium on Polymer Education. Other symposia were on Characterization; Polymer Synthesis; Polymers for New Technologies; Polymers; the Environment and Health Issues; Structure and Properties; Engineering Polymers; Theory and Modeling of Polymer Systems, Films, Surfaces and Interfaces; Novel Polymers; Polymer Colloids; Rheology and Processing; and Polymer Photophysics and Photochemistry. Each of these symposia was co-organized by an Australian scientist and an overseas scientist.

Australia is an old land geologically, but Australian

science is young and vigorous, and Australian polymer scientists welcomed the opportunity to host the most important biennial conference in the field at the forefront of polymer science and technology. Many components contributed to the success of this conference—especially the excellence of the delegates and the large number and vigor of the younger participants who will be the next scientific generation. An essential ingredient for a successful conference is the willingness of all participants to learn and to interact both inside and outside the lecture rooms. It was for this reason that the venue was chosen at the Gold Coast, where the networking that is vital for world science was nurtured by the pleasant environment. Delegates left the conference with new knowledge and new friends, from which will grow new science.

There were a number of special parts to this conference. One was the Young Scientists program, which encouraged interchange among research students and other young scientists from around the world. Another was the Industrial Forum, which focused on the applications of our science. These applications are vital, when financial changes pose a challenge to us all to help wealth creation, in the deepest meaning of the expression, and to improve the quality of life. The nature of our field is such that we can all help make a better world.

This conference came about because of the dedication, vision, energy, organizational skills, and enthusiasm of the late Prof. Jim O'Donnell of the Chemistry School of the University of Queensland, who died tragically of cancer three years before the conference. Jim was a fine polymer scientist and internationalist, a personal friend and mentor to many of the attendees, and one who cared greatly for international issues and for



Prof. Jim O'Donnell

the good of young polymer scientists. The numbers and diversity of overseas delegates, and the high quality and number of the scientific papers at Macro98, are some of Jim's memorials.

Prof. Robert G. Gilbert, Cochair, Macro98 World Polymer Congress

President, IUPAC Macromolecular Division

Prof. Donald H. Napper, Cochair, Macro98 World Polymer Congress

***Magnitudes, Unidades y Símbolos en Química Física**, segunda edición. Por Andrés Pérez Masiá, José M. Guil, Josefa E. Herrero, y Anselmo Ruiz Paniego. Editorial Centro de Estudios Ramón Areces, S.A., Madrid, Spain (1999), pp. ix + 1–214. ISBN 84-8004-361-X. [Spanish translation of IUPAC “Green Book”, *Quantities, Units, and Symbols in Physical Chemistry*, 2nd edition. Prepared for publication by Ian Mills, Tomislav Cvitaš, Klaus Homann, Nikola Kallay, and Kozo Kuchitsu. Blackwell Science (1993), pp. ix + 1–166.]*

This Spanish translation of the 2nd edition of the IUPAC “Green Book” was prepared by Andrés Pérez Masiá, José M. Guil, Josefa E. Herrero, and Anselmo Ruiz Paniego, Instituto de Química Física “Rocasolano”, CSIC, Madrid, Spain. It is available from Editorial Centro de Estudios Ramón Areces, S.A., Tomás Bretón, 21, E-28045, Madrid, Spain.



The 2nd edition of the IUPAC “Green Book” represents a further revision of the 1988 edition, incorporating resolutions of the Conférence Générale des Poids et Mesures (CGPM), international standards of ISO-31, and recommendations from the International Union of Pure and Applied Physics (IUPAP) and from other IUPAC commissions. Major additions beyond the 1988 edition appear in the sections on quantum mechanics and quantum chemistry, electromagnetic radiation, and chemical kinetics, in order to include physical quantities used in the rapidly developing fields of quantum chemical computations, laser physics, and molecular beam scattering. Sections have been added on dimensionless quantities, and on acronyms and abbreviations used in chemistry, and a full subject index has been added to the previous symbol index.

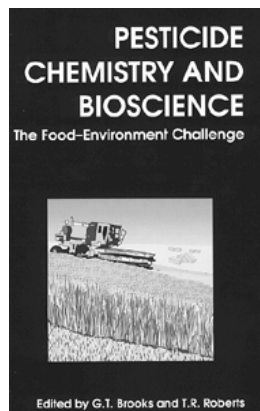
New Book from The Royal Society of Chemistry

***Pesticide Chemistry and Bioscience: The Food–Environment Challenge.* Edited by G. T. Brooks and T. R. Roberts. Hardcover, 1999, ix + pp. 1–438. Special Publication No. 233, ISBN 0-85404-709-3.**

Pesticide chemistry has seen many remarkable changes and advances in recent years. Further challenges must be faced to advance the field, and this book, produced as a result of the 9th IUPAC International Congress of Pesticide Chemistry (held in London 2–7 August 1998) and written by leading international experts, reports on the need to produce high-quality food while satisfying environmental concerns. Including new material on natural products, chemical synthesis, mode of action, metabolism, resistance, regulation, and risk assessment, *Pesticide Chemistry and Bioscience* updates all of the key areas in pesticide chemistry and related activities. Together, the contents outline the revolution in approaches to crop protection and in our abilities to develop complex, environmentally acceptable strategies for weed, pest, and disease control.

This collection of current expert views and findings will be of immense interest to researchers and professionals working in the field of pesticide chemistry.

To order, contact Sales and Customer Care, The Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, England CB4 0WF, UK; E-mail: sales@rsc.org; Tel.: +44 1223 420066; Fax: +44 1223 423429; Web site: <http://www.rsc.org/metpath> or <http://www.chemsoc.org/>.



New Publications from the World Health Organization

Principles for the Assessment of Risks to Human Health from Exposure to Chemicals, Environmental Health Criteria No. 210

1999, xx + 110 pages (English with summaries in French and Spanish), ISBN 92-4-157210-8, CHF 29.–/USD 26.10; In developing countries: CHF 20.30, Order No. 1160210. WHO Marketing and Dissemination, CH-1211 Geneva 27, Switzerland; E-mail:

bookorders@who.ch; Tel.: +41 22 791 24 76; Fax: +41 22 791 48 57.

This book provides a state-of-the-art review of methods and procedures for assessing the risks to human health posed by environmental chemicals. Addressed to regulatory authorities, risk managers, and other decision-makers, the book aims to demystify the principles of risk assessment and thus to encourage wider use of this powerful tool for protecting populations.

Because the detection of chemical hazards may have socioeconomic and political consequences, the book gives particular attention to methods for the accurate identification of risks and determination of their severity. Details range from an alert to sources of uncertainty in scientific evidence, through an explanation of the distinction between individual and population risks, to a list of questions commonly addressed during risk characterization. Practical advice on various options for risk elimination or reduction is also provided in this comprehensive guide.

The book has four chapters covering each logical step in the process of risk assessment. The first, on hazard identification, explains how data on a chemical's toxicity and mode of action can be used to determine whether the chemical will cause adverse effects on health. The strengths and limitations of different types of data are discussed, together with criteria commonly used to establish causality. Methods for assessing dose-response relationships are reviewed in Chapter 2, which explains how to characterize the relationship between the dose administered or received and the incidence of an adverse effect. Methods for assessing nonneoplastic, or threshold, effects and neoplastic, nonthreshold effects are described in detail.

Exposure assessment is covered in the next chapter, which describes methods for determining the nature and extent of contact with chemical substances and discusses the special characteristics of exposure in the general environment, in the workplace, and from consumer products. The final chapter explains the procedure of risk characterization as a decision-making tool that brings together estimates of exposure levels and risks and summarizes sources of uncertainty in the scientific data. Practical options for risk management are presented as a range of regulatory, nonregulatory, economic, advisory, and technological measures.

***Monitoring Ambient Air Quality for Health Impact Assessment* (WHO Regional Publications, European Series, No. 85), WHO Regional Office for Europe, Copenhagen, Denmark**

1999, 196 pages (available in English only), ISBN 92-890-1351-6, CHF 62.–/USD 55.80, Order No. 1310085.

Air quality assessment is frequently driven by the need to determine whether a standard or guideline has

been exceeded, but it should also provide the information needed to estimate population exposure to air pollution and the effects on the health of the population. Most air quality monitoring systems do not fully address population exposure to toxic air pollution. Health impact assessment combines estimates of population exposure with information on toxicity.

Given the importance of the availability of valid information on population exposure to air pollutants, the WHO European Centre for Environment and Health organized a working group to define the features of monitoring networks that allow their use in assessing the potential exposure of the population to air pollution from ambient air. This work resulted in this book. The principles outlined are intended to promote progressive modification of the networks monitoring air quality to improve their usefulness for health impact assessment.

This book is directed specifically to network managers, to those who design new networks or modify existing ones, to policy-makers, and to those who influence policy.

Guidelines for Preparing Core Clinical-Safety Information on Drugs, 2nd edition. Including New Proposals for Investigator's Brochures. Report of CIOMS Working Groups III (Revised) and V (New)

1999, 98 pages (available in English only), ISBN 92-9036-070-4, CHF 15.-/USD 13.50; In developing countries: CHF 10.50, Order No. 1840021.

This book is a revised and expanded edition of the first internationally agreed guidelines covering the minimum drug safety information that should be communicated by manufacturers to physicians and other prescribers. Originally published as the CIOMS Working Group III report, the "Core Safety Information" specified in the guidelines has been widely endorsed as a

standard for the preparation of all official national data sheets, package inserts, product labels, and other official statements issued by manufacturers.

The original guidelines were produced in response to the need to harmonize drug safety information. As their principal objective, the guidelines aim to ensure that data sheets contain the information most needed to help prescribers balance a product's risks against its benefits, and thus make good therapeutic decisions.

The book also includes the new report of CIOMS Working Group V. This report extends the original guidelines to include recommended safety information on drugs undergoing investigation. Intended to guide the content of company investigators' brochures, this "Development Core Safety Information" then forms the basis for the core safety information eventually issued for the marketed product.

The report of Working Group V is published as an additional set of proposals for the assessment and presentation of safety information in investigators' brochures. Proposals, which follow the same practical approach used to produce core clinical safety information, are intended to provide researchers with all relevant clinical and nonclinical information and to assist pharmaceutical companies in meeting their reporting obligations. In addition, guidance is provided on the global distribution to investigators of new safety information, such as 7-day and 15-day alerts to serious, unexpected adverse reaction. The proposals should also facilitate the work of ethics review committees when assessing the benefits and risks to participants in clinical trials.

The book concludes with the text of the European Summary of Product Characteristics and a summary of the U.S. FDA Requirements, examples of illustrative drug scenarios used by the working group, and a model of Core Safety Information proposed for a fictitious drug.

Letter to the Editor

Prof. Donald Weaver wrote an interesting article (*Chemistry International*, January 2000, Vol. 22, No. 1, pp. 11–13), wherein he took to task a number of alternative medicine practices. In particular, he cited a number of instances from his own experience where patients ignored standard medical treatment for alternatives that led to their death or serious complications. In the cases he wrote about, it was clear that the patients made very poor choices. However, there are two areas of what some may consider alternative medical practices where the evidence of their benefit is quite clear.

The first of these is the research by David Spiegel,

MD, who showed unequivocally¹ that psychotherapeutic support groups can have beneficial effects on *both* the mental and physical well-being of the patient. Because the readers of *CI* may not be aware of Spiegel's research, even though his seminal paper was published over eleven years ago, I will briefly summarize the work of his group and its outcomes. Spiegel's initial thesis was that a psychotherapy support group would probably be helpful in easing the burdens of cancer, but would have no effect on the physical outcomes of the disease. They enrolled 87 women who had fourth-stage metastatic breast cancer. Fifty women were in the in-

tervention group and 37 in the control group. All of the women continued to receive whatever medical treatments their doctors recommended. The women in the support group met weekly for one year. They were taught self-hypnosis for pain control, they could share whatever they wished during the meetings, were encouraged to communicate with group members outside of the meetings, and one of the group leaders was a woman who had breast cancer that was in remission. The ten-year followup showed that all of the women in the control group died, and that their average length of survival from the beginning of the study was 18.9 months (SD = 10.8). Three of the women in the support group were still alive ten years later. The 47 women in the support group who died had lived an average 36.6 months (SD = 37.6) from the beginning of the study. This work has been replicated and shows that a psychotherapy support group can have a significant effect on the longevity and quality of life of cancer patients. The important question here, given the evidence, is the following: "Why does not every oncologist prescribe group psychotherapy for his/her patients?" These support groups are probably *more* effective than any of the "standard" treatments for fourth-stage metastatic breast cancer.

Although there is little evidence for special diets and herbs for helping people with cancer and cardiovascular disease, there is a great deal of evidence that Dr. Dean Ornish's regimen of low-fat diets, support groups, exercise, and meditation² has a profound effect on the course of cardiovascular disease. Please note that Dr. Ornish does not recommend one diet, but a total lifestyle change in several areas. Ornish's work has stood the test of time, even though scoffers have pushed it aside as one of those alternative things. Again, the question is as follows: "Why doesn't every cardiologist encourage his/her patients to follow this regimen?"

My new book³ cites the scientific evidence for mind/body interactions for healing, and emphasizes a multimodal approach to working with people who have life-challenging diseases. An important question is this: "How much does the placebo effect contribute to *both* traditional and alternative medicine?" A major component of all double-blind studies is to separate out the ever-present placebo effect from that of the "active" ingredient or treatment. The placebo effect is always significant, and there is a vast literature on it. (A summary of the placebo effect is in Chapter 4 of Reference 3.) Any alternative work, of course, should always be done in *cooperation* with medical doctors. As scientists, we need to be skeptical and look for scientific proof—such proof is available for the two "alternative" approaches described above.

References

1. D. Spiegel, J. R. Bloom, H. C. Kraemer, E. Gottheil. Effect of psychosocial treatment on survival of patients with metastatic breast cancer. *Lancet* 2, 8668, 888–891 (1989).
2. D. Ornish. *Dr. Dean Ornish's Program for Reversing Heart Disease*, New York: Ballantine Books (1991).
3. R. Battino. *Guided Imagery and Other Approaches to Healing*, Crown House Publishing, April 2000.

Sincerely yours,

**Rubin Battino, Professor Emeritus of Chemistry
MS, Mental Health Counseling
Associate Member, IUPAC Commission on
Solubility Data (V.8)
Department of Chemistry, Wright State University,
Dayton, Ohio**

Reports from Commissions and Division Committees

Physical Chemistry Division Committee (I.0)

Summary of Minutes of Division Committee Meeting at IUPAC General Assembly, Berlin, Germany, 7–11 August 1999

The Physical Chemistry Division Committee (PCDC) devoted much time to discussing its future structure and function. The restructuring of IUPAC, with the abolishment of Commissions, will give the Division Committee a drastically changed role with much increased

responsibility and work. The Division Committee will in the future be responsible for project generation and evaluation of proposals, followup and finalization of projects, and assessment of final results. Recruitment of Committee members and distribution of work among the members will be crucial for the work of the Division under the new organization. The number of projects that will be carried will be reduced when the Commissions disappear. It was suggested that the present structure of technique-oriented Commissions be replaced by one based on areas of physical chemistry, focusing on areas where IUPAC could contribute significantly. No

decisions on these matters were made in Berlin. The newly elected Division Committee is scheduled to meet around the beginning of March 2000 to continue the discussions and make decisions that will determine how the Physical Chemistry Division will function in the future.

The status of the projects of the Division is good. Of the 55 projects listed in the *IUPAC Handbook 1998–1999*, 16 had been completed by 1999, 4 had been closed, and 30 were expected to be completed by 2001, leaving only 5 that may need to continue (after being reconsidered) under the new organization. New projects have been proposed, and the Division Committee will discuss them during the spring meeting and decide how these proposals should be managed. The question “Why IUPAC?” will be important when discussing future projects.

Gerd Olofsson

Secretary, IUPAC Physical Chemistry Division Committee I.0

Commission on Molecular Structure and Spectroscopy (I.5)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

Thirteen members of the Commission on Molecular Structure and Spectroscopy (I.5), including national representatives and observers, met for three days during the 40th General Assembly at die Freie Universität, Berlin, Dahlem. Two new titular members, Profs. R. McDowell and N. Hirota, and two new associate members, Profs. P. v. R. Schleyer and Quing-Shi Zhu, were introduced.

Four projects were completed, and three of these were published in *Pure and Applied Chemistry (PAC)*: J. E. Bertie, Specification of Components, Methods, and Parameters in Fourier Transform Spectroscopy by Michelson and Related Interferometers, *PAC*, **70**, 2039–2045 (1998), which will also be published in the *Australian Journal of Chemistry*; R. K. Harris, J. Kowalewski, and S. Cabral de Menezes, Parameters and Symbols for Use in Nuclear Magnetic Resonance, *PAC*, **69**, 2489–2495 (1997), which has also been published in two journals devoted to NMR spectroscopy; and J. E. Boggs, Guidelines for the Presentation of Methodological Choices in the Publication of Computational Results, Part A. Ab Initio Electronic Structure Calculations, *PAC*, **70**, 1015–1018 (1998). One article was approved by the Commission: J. J. P. Stewart, Guidelines for the Presentation of Methodological Choices in the Publication of Computational Results, B. Semiempirical Electronic Structure Calculations, to

be submitted to *PAC*. The following book has been published: *Nonlinear Spectroscopy for Molecular Structure Determination* (editors: R. W. Field, E. Hirota, J. P. Maier, and S. Tsuchiya), 276 pages, Blackwell Science, Oxford, 1998.

Other projects are close to completion: R. S. McDowell, J. E. Bertie, P. R. Bunker, J.-M. H. Flaud, J. T. Hougen, P. Rosmus, J. K. G. Watson, and B. P. Winnewisser, “Notations and Conventions in Molecular Spectroscopy: Part 4. Rotation-Vibration Spectroscopy”, which, after minor changes, will be submitted to *PAC*; R. K. Harris, E. Becker, W. Bremser, S. Cabral de Menezes, R. Goodfellow, and P. Granger, “Provisional Recommendations for NMR Nomenclature, Nuclear Spin Properties, and Conventions for Chemical Shifts”, which is nearly finished and will be submitted to *PAC* and possibly to other NMR journals; and R. Janoschek, “The Computation of Experimental Structure and Properties of Small Molecules by Ab Initio Calculations”, which is a comprehensive work of about 100 pages that will, after completion, be submitted to a specialized journal.

An extensive report of about 220 pages on high-pressure spectroscopy by A. M. Heyns, D. M. Adams, W. B. Holzapfel, M. N. Nicol, and Ph. Pruzan, *Spectroscopy under Extreme Conditions of Pressure and Temperature*, will, it is hoped, be completed in the near future, possibly to be published as a book. A preliminary report by M. Terazima and N. Hirota, *Quantities, Terminology, and Symbols in Photothermal and Related Spectroscopies*, was presented; it is hoped that the work will be completed in 2001. The project of J. E. Boggs, “Guidelines for the Presentation of Methodological Choices in the Publication of Computational Results, C. Molecular Mechanics Calculations”, has been delayed because of slow cooperation with Commission I.7.

Joint meetings were held between Commission I.5 and Commissions V.4 and I.1. With Commission V.4, the pending projects of each commission were reported, and various projects of common interest were discussed. Additions and alterations that should be included in the next edition of the “Green Book” (*Quantities, Units, and Symbols in Physical Chemistry*) were discussed with Commission I.1.

It is a general belief among the members of Commission I.5 that the new organization of IUPAC after 2001 will have a negative influence on the future scientific activity of IUPAC, leading to more political and less scientific activity.

The chairman, John E. Bertie, thanked the members for their contributions to the work of Commission I.5.

Peter Klaeboe

Secretary, IUPAC Commission on Molecular Structure and Spectroscopy I.5

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

Because IUPAC future activities will be exclusively based on projects, the Commission has devoted most of its time to examination of the status of ongoing projects and to the discussion of proposals for new projects. The Commission was pleased to see that the projects “Guidelines for publication of research results from force-field calculations”, “Critical compilation of scales of medium effects”, and “Glossary of terms used in theoretical organic chemistry” have all been completed, and that the first two have already been published in *PAC*. It was noted, however, that further work is still necessary to complete the *Glossary of Terms in Supramolecular Chemistry*. Very sensitive to environmental problems, the Commission has given particular attention to the ongoing project on Green Chemistry, led by Prof. Tundo, for which a Working Party had already been established.

A White Book on Green Chemistry will be produced soon containing a Symposium-in-Print, organized in collaboration with the Subcommittee on Organic Synthesis of the Division of Organic Chemistry. This project was also examined in a joint meeting of the Commission with the project Working Party and Division VI (Chemistry and the Environment), which was also attended by the IUPAC Secretary General, Dr. E. D. Becker. The project, which is in line with almost all of IUPAC’s goals, was fully endorsed by the Commission, and Division VI promised all possible support.

In the same area, a new project concerning environmental degradation of organic compounds was proposed by Prof. Nudelman. The aim of the project is the evaluation of available chemical information on the chemical and photochemical fate of organic pollutants in the environment. The project was considered interesting, but too broad. It was suggested that the project should be better defined before presentation.

In the field of education, the Commission has dedicated an entire meeting to the discussion of the project for an international organic chemistry curriculum proposed by Prof. Nudelman. Profs. Takeuchi and Bradley of the Committee on Teaching of Chemistry (CTC) also attended this meeting. The aim of this project is to establish updated organic chemistry curricula, which should facilitate exchange of students and transferability of courses and curricula. The project was considered very useful and received the support of the Commission; however, in order to be approved by IUPAC, some goals of the project should be revised in the light

of the criticism expressed by the CTC and the Division of Organic Chemistry.

Prof. Abboud’s proposal for a new project “Critical compilation of hydrogen bonding acidity and basicity scales for solutes” was discussed and fully endorsed. The possibility of undertaking projects in the near future concerning the second part of the “Critical compilation of scales of solvent parameters: Materials”, “Strength of strong acids”, and a “Bioorganic glossary” was also discussed.

A joint meeting with the Commission on Photochemistry (III.3) also took place, during which the two Commissions exchanged information concerning their respective ongoing projects and future plans in the light of the forthcoming restructuring of IUPAC.

The next meeting of the Commission will take place in connection with the 15th IUPAC Conference on Physical Organic Chemistry (Göteborg, Sweden, 8–13 July 2000).

Charles L. Perrin
Chairman, IUPAC Commission on Physical Organic Chemistry III.2

Enrico Baciocchi
Secretary, IUPAC Commission on Physical Organic Chemistry III.2

Commission on Macromolecular Nomenclature (IV.1)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 7–11 August 1999

The meeting was attended by all Titular Members, six Associate Members, three National Representatives, ten consultants, correspondents and observers, and the Division Chairman and Secretary.

At the date of the meeting, the Commission had thirteen projects underway. Two were open for public review (18/87, “Liquid crystals” and 19/89, “Regular single-strand nomenclature”), two more were expected to be submitted to IDCNS and public review before the end of March of 2000 (21/92, “Source-based generic nomenclature” and 25/95, “Asymmetric polymerization”), and the remaining nine were in various stages of development for further consideration during the Warsaw 2000 meeting. The Commission also had nine feasibility studies in progress, two of which became projects (32/99, “Terminology of ion-containing polymers” and 33/99, “Source-based nomenclature for modified polymer molecules”), while the other seven moved closer to becoming projects during the Warsaw meeting.

The Commission also reviewed other activities, including a comprehensive list of terms, the 2nd edition of the "Purple Book", and a history of the Commission since its creation.

In preparation for discussion of the IUPAC restructuring project at the Division level, the project was examined in considerable detail. The main concern expressed by all members was the possible loss of continuity, considered essential in nomenclature work. Therefore, it was unanimously resolved to support the continuation of this Commission in its present form.

Maximo Baron
Secretary, IUPAC Commission on Macromolecular Nomenclature IV.1

Commission on Agrochemicals and the Environment (VI.4)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

Twenty-one members of the Commission on Agrochemicals and the Environment (VI.4) met for three days during the General Assembly in Berlin. Meetings for the next three years will be in Taichung (2000) in association with a workshop, Brisbane (2001), and Basel (2002).

The Commission discussed fourteen projects at various stages from proposed to completed and ready for publication. It is current practice for the whole Commission to review the recommendations from each project before publication. It is not clear who will have this role once the commissions disappear. The recommendations could hardly be IUPAC recommendations if they are sent for external review because the expertise will no longer reside in IUPAC.

Extended summaries of reports, previously published in *Pure and Applied Chemistry*, have been published in *Pesticide Science*. The Commission web site is running, with full copies of recent papers from *Pure and Applied Chemistry* and *Chemistry International* available. An active *Glossary of Terms* has been established.

Denis Hamilton
Secretary, IUPAC Commission on Agrochemicals and the Environment VI.4

Commission on Nomenclature, Properties, and Units (C-NPU) (VII.C.1)

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

The main focus of this meeting was on harmonization of current projects of this commission with the new structure being implemented by the Union. Most of the ongoing projects will be finished during this biennium; however, some of them, like the C-NPU Internet web site, which is a core project for this Commission, are ongoing activities. The Commission brought this point to the attention of the Division during the Division meeting in Berlin.

It is a clear commitment of the C-NPU to participate actively in the new projects proposed for the Chemistry and Human Health Division, contributing to the nomenclature, according to the interdisciplinary character of these broad projects. A new interdivisional project was proposed on the use of the NPU concept system for properties in the field of environmental chemistry. The project will be prepared by the collaborative effort of the two divisions, including A. Kallner, J. H. Duffus, and W. R. Külpmann.

The composition of the C-NPU for the biennium 2000–2001 will be as follows:

Titular Members (TMs): Urban Forsum (Chairman), Pedro Soares de Araujo (Secretary), Antonin Jabor, Wolf R. Külpmann, and Gunnar Nordin. There is still one open position for TM, and a candidate will be proposed after further consultation.

Associate Members (AMs): Xavier Fuentes-Arderiu, J. Gilbert Hill, Desmond Kenny, Eugeny V. Yurtov, Henrik Olesen, and René Dybkaer.

It was agreed that C-NPU would meet twice a year during the 2000–2001 biennium in order to maintain its current productivity.

Pedro Soares de Araujo
Secretary, IUPAC Commission on Nomenclature, Properties, and Units VII.C.1

Provisional Recommendations

IUPAC Seeks Your Comments

In this section, we publish synopses of IUPAC's latest provisional recommendations on nomenclature and symbols. All comments on these recommendations are welcome and will be taken into consideration. The final revised versions are published in *Pure and Applied Chemistry*, and synopses of these are published in *Chemistry International* as recent reports.

If you would like to comment on the provisional recommendations, please write to your nearest national/regional center to request a copy of the full report. Copies are not available from the IUPAC Secretariat. The most recent list of national/regional centers appeared in *Chemistry International* 1997, 17, 141. This information is also available on the IUPAC web site: <http://www.iupac.org/>.

Physical Chemistry Division. Commission on Colloid and Surface Chemistry Including Catalysis—Nomenclature of Structural and Compositional Characteristics of Ordered Microporous and Mesoporous Materials with Inorganic Hosts

A system of terms applicable to ordered microporous and mesoporous materials is proposed, and rules for writing a standardized crystal chemical formula for such materials are presented. The recommendations are based both on common usage and on a systematic classification scheme. The nomenclature has been developed to encompass all inorganic materials with ordered, accessible pores with free diameters of less than 100 nm. The crystal chemical formula describes the chemical composition of both the guest species and the host, the structure of the host, the structure of the pore system, and the symmetry of the material. This formula can be simplified or expanded to suit the user's requirements.

Comments by 31 October 2000 to Dr. Lynne B. McCusker, Laboratorium für Kristallographie, ETH-Zentrum, CH-8092 Zürich, Switzerland. Tel.: +41 1 632 3721, Fax: +41 1 632 1133, E-mail: Lynne.McCusker@kristall.erdw.ethz.ch.

Conference Announcements

3rd Biennial International Conference on Chemical Measurement and Monitoring of the Environment (EnviroAnalysis 2000), 8–11 May 2000, Ottawa, Ontario, Canada

For information, contact Conference Secretariat, Carleton University, Chemistry Department, 1125 Colonel By Dr., Ottawa, ON K1S 5B6 Canada; Fax: +1 613 520 3679; Web site: <http://www.carleton.ca/~rburk/ea2000/>.

Dietary Fibre 2000 (Sponsored by ICC/AOAC International), 14–17 May 2000, Dublin, Ireland

For information, contact Angela Kennedy (Conference Secretariat), Megazyme International (Ireland) Limited, Bray Business Park, Bray, Co. Wicklow, Ireland; E-mail: angela@megazyme.com; Fax: +353 1 286 1264.

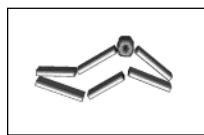
9th International Symposium on Luminescence Spectrometry in Biomedical and Environmental Analysis—Spectroscopic and Imaging Detection Techniques, 15–17 May 2000, Montpellier, France

For information, contact Prof. Dr. Dan A. Lerner, University of Montpellier Ecole Nationale Supérieure de Chimie 8, Rue de l'Ecole Normale, F-34296 Montpellier Cedex 5, France; E-mail: lerner@enscm.fr; Tel.: +33 04 67144323; Fax: +33 04 67144349.

30th Annual International Symposium on Environmental Analytical Chemistry (30th ISEAC), 13–16 June 2000, Espoo, Finland

For information, contact M. Frei-Hayusler, P.O. Box 46, CH-4123 Allschwil 2, Switzerland; E-mail: iaeacmfrei@access.ch; Tel.: +41 61 481 27 89; Fax: +41 61 482 08 05.

6th European Training Course on Carbohydrates, 8–14 July 2000, Debrecen, Hungary



This course provides an introduction to modern principles, tools, and trends of carbohydrate chemistry and technology. Participants need a higher education in chemistry or a related discipline, e.g., biochemistry, chemical technology, or food science.

The program will include sessions on analysis (“Methods in structural analysis of carbohydrates I and II”); synthesis (“Glycosylation reactions: principles and illustrations”, “Synthesis of bioactive oligosaccharides and glycoconjugates”, “Combinatorial chemistry of carbohydrates”, and “Saccharide engineering: *in vivo* and *in vitro* use of enzymes”); structure—function (“Structure and function of glycoconjugates”, “Physicochemical properties of polymers”, “Molecular organization in polysaccharide assemblies”, and “Molecular modeling of oligosaccharides, polysaccharides, and protein–carbohydrate interactions”); and industrial applications (“Cyclodextrins: From scientific curiosity to thousand-ton scale production”; “Cellulose and cellulose derivatives—molecular and supramolecular structure design”; “Starch and modified starches: Production, structure, properties, and application”; and “Bacterial polysaccharides”). There will also be workshops on renewable raw materials and on nomenclature of carbohydrates. Special topics seminars will include “Wonders in wine: chemistry and art”, “Carbohydrates in cyber space”, “Physiological effects of structurally different oligosaccharides”, “Sugar-derived building blocks for the synthesis of noncarbohydrate natural products”, “Medical application of antibiotics containing carbohydrates”, and “Cell wall polysaccharides: Key components in food processing”.

The social program will include a working excursion to the Rakoczi vineyard in Tokaj in the northeastern corner of Hungary, an organ concert in the Church of Debrecen, and a restaurant dinner.

A limited number of grants for free participation will be made available to selected candidates.

For more information, contact Carbohydrate Research Foundation, c/o Ms. Ellen Jansen (Zestec), P.O. Box 96882, 2509 JG, the Hague, Netherlands; E-mail: crf@zestec.com; Tel.: +31 70 3544 09 82; Fax: +31 70 351 53 18; Web site: <http://www.zestec.com/crf/tc/6/>.

6th Polish Conference on Analytical Chemistry, 9–14 July 2000, Gliwice, Poland

For information, contact 6th Polish Conference on Analytical Chemistry, Silesian Technical University, Department of Analytical and General Chemistry, Faculty of Chemistry, ul. M. Strzody 9, 44-100 Gliwice, Poland; E-mail: analitk@zeus.ppolsl.gliwice.pl; Tel./Fax: +48 32 237 12 05; Web site: <http://www.ppolsl.gliwice.pl/~analitk/>.

Food BioPack Conference: Production and Application of Biobased Packaging Materials for the Food Industry, 27–29 August 2000, Copenhagen, Denmark

This conference, organized under the auspices of the European Union (EU), will cover a wide range of subjects related to biobased/biodegradable packaging materials, including food applications, origin of resources, performance and properties, biodegradability/compostability, food quality and safety aspects, edible coatings and films, disposal, consumer aspects, and marketing. The conference will take place at the Royal Veterinary and Agricultural University in Copenhagen. Its proceedings will result in a state-of-the-art report addressed to the food and packaging industries, retailers, legislative authorities, and academia.

For more information, contact Dr. Claus Weber, Department of Dairy and Food Science, Royal Veterinary and Agricultural University, Rolighedsvej 30, DK-1958 Frederiksberg C, Denmark; E-mail: clj@kvl.dk; Tel.: +45 3528 3249; Fax: +45 3528 3245; Web site: <http://www.mli.kvl.dk/foodchem/special/biopack/>.

CODATA Molten Salt Working Group Workshop on Building Information on Molten Salts, 18–20 September 2000, Marseille to Corsica, France

The goal of this first workshop of CODATA's new Working Group on Molten Salts is to discuss barriers to and propose solutions for bringing together the vast amount of data in the molten salt literature into a “Virtual Molten Salt Data Laboratory”.

The workshop will consist of individual presentations and panel discussions. Principal issues will be the large amount of data available in the literature and the effective use of the Internet to link together the differ-

ent communities of data generators and data users. Following completion of the workshop, a summary of the proceedings will be posted on the Internet, and a working model will be proposed for creation of a centralized data laboratory.

Molten salts are high-temperature liquids widely used in a number of industrial applications, including:

- elaboration (electrodeposition of metals, synthesis of materials, etc.)
- energy (fuel cells, batteries, thermal storage, etc.)
- environment (waste processing, recycling, etc.)
- nuclear industry (recycling of spent fuel, etc.)
- lighting industry

Other topics to be addressed include the following:

- What community action, if any, is needed to retrieve the older data, both in the open and "grey" literature?
- What databases exist currently, and are there gaps that need to be filled?
- What additional standards are needed to facilitate the building of a "Virtual Molten Salt Data Laboratory"? Delivery? Integration?
- What actions are needed to sustain the molten salt

data community, especially as the World Wide Web promotes individual actions?

The workshop will take place partly in Marseille (one-half day) and mostly aboard the *Napoleon Bonaparte*, a luxury ferry linking Marseille to Corsica, with all conference facilities aboard.

For further information, contact Marcelle Gaune-Escard (mge@iusti.univ-mrs.fr), Joan Fuller (joan.fuller@nist.gov), or the Workshop Secretariat, c/o Joyce Bartolini, IUSTI, Technopole de Chateau Gombert, 5 Rue Enrico Fermi, F-13453 Marseille Cedex 13, France; E-mail: molten.salts@iusti.univ-mrs.fr; Tel.: +33 (0) 4 91 68 82; Fax: +33 (0) 4 11 74 39.

AOCS/JOCS Joint Meeting 2000, 22–27 October 2000, Kyoto, Japan

For information, contact American Oil Chemists Society (AOCS) Meetings and Exhibits Department, P.O. Box 3489, Champaign, IL 61826-3489, USA; E-mail: meetings@aoacs.org; Tel.: +1 217 359 2344; Fax: +1 217 351 8091.

Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

NEW designates a new conference since the last issue.

2000

Mycotoxins and Phycotoxins

21–25 May 2000
10th International IUPAC Symposium on Mycotoxins and Phycotoxins, Guarujá, São Paulo, Brazil.
Complete Events & Associates, Rua Joaquim Antunes, 490 - 8º - 82 05415-001 São Paulo, Brazil.
Tel.: +55 (11) 3068 8783
Fax: +55 (11) 3061 0780
E-mail: mycbr2000@complete.com.br

Polymer-Based Technology

21–26 May 2000
9th International Conference on Polymer-Based Technology (POC'2000), Tianjin, China.
Prof. Zhang Zhengpu, Institute of Polymer Chemistry, Nankai University, 94 Weijin Road, Tianjin 300071, China.
Tel.: +86 22 2350 1386
Fax: +86 22 2350 4853
E-mail: zhangzp@sun.nankai.edu.cn

Flow Analysis

25–29 June 2000
8th International Conference on Flow Analysis, Warsaw, Poland.

Prof. Marek Trojanowicz, Department of Chemistry, University of Warsaw, Pasteura 1, 02-093 Warsaw, Poland.
Tel/Fax: +48 22 822 35 32
E-mail: trojan@chem.uw.edu.pl

Organic Synthesis

1–5 July 2000
13th International Conference on Organic Synthesis (ICOS-13), Warsaw, Poland.
Prof. M. Makosza, Institute of Organic Chemistry, Kasprzaka 44, 01-224 Warsaw 42, P.O. Box 58, Poland.
Tel.: +48 22 631 8788
Fax: +48 22 632 6681
E-mail: icho-s@ichf.edu.pl

Chemical Sensors

3–5 July 2000

8th International Meeting on Chemical Sensors (ES-IMCS'2000), Basel, Switzerland.

This conference has declined IUPAC sponsorship.

Physical Organic Chemistry

8–13 July 2000

15th International Conference on Physical Organic Chemistry (ICPOC 15), Göteborg, Sweden. Prof. P. Ahlberg, Organic Chemistry, Department of Chemistry, Göteborg University, SE-412 96, Göteborg, Sweden.

Tel.: +46 31 7722900

Fax: + 46 31 7723843

E-mail:

Per.Ahlberg@oc.chalmers.se

Macromolecules

9–14 July 2000

38th International Symposium on Macromolecules (MACRO 2000), Warsaw/Łódź, Poland.

Prof. Stanislaw Penczek, Polish Academy of Sciences, ul. Sienkiewicza 112, 90363 Łódź, Poland.

Tel.: +48 42 81 9815

Fax: +48 42 684 7126

E-mail:

spenczek@bilbo.cbmm.lodz.pl

Coordination Chemistry

9–14 July 2000

34th International Conference on Coordination Chemistry (34-ICCC), Edinburgh, Scotland.

Prof. P. Tasker, Chairman

Dr. John F. Gibson, Secretary

The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.

Tel.: +44 171 440 3321

Fax: +44 171 734 1227

E-mail: gibsonj@rsc.org

Polymers in Medicine

17–20 July 2000

40th Microsymposium on Polymers in Medicine, Prague, Czech Republic.

Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Science of the Czech Republic, Heyrovského nam. 2, 162 06 Praha 6, Czech Republic.

Tel.: +420 2360341

Fax: +420 2367981

E-mail: sympo@imc.cas.cz

Polymer Networks '2000

17–21 July 2000

15th Polymer Networks Group Meeting "Polymer Networks '2000", Cracow, Poland.

Prof. H. Galina, Rzeszow University of Technology, Faculty of Chemistry, W. Pola Str.2, PL 35-959 Rzeszow, Poland.

Tel.: +48 17 628 057

Fax: +48 17 854 3655

E-mail: hgal@prz.rzeszow

Photochemistry

22–27 July 2000

18th IUPAC Symposium on Photochemistry, "Photochemistry into the New Century", Dresden, Germany.

Prof. Dr. Silvia E. Braslavsky, Max-Planck Institut für Strahlenchemie, Postfach 101365, D-45413 Mülheim an der Ruhr, Germany.

Tel.: +49 (208) 306 3681

Fax: +49 (208) 306 3951

E-mail: braslavskys@mpi-muelheim.mpg.de

Organometallic Chemistry

23–28 July 2000

19th International Conference on Organometallic Chemistry (XIX ICOMC), Shanghai, China.

Profs. Li Xin Dai and Chang Tao Qian, Chairmen, Prof. Xue Long Hou, Secretary, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, 354 Fenglin Road, Shanghai 200032, PR, China,

Tel.: +86 21 641 63300

Fax: +86 21 641 66128

E-mail: xlhou@pub.sioc.ac.cn

Solubility Phenomena

25–28 July 2000

9th International Symposium on Solubility Phenomena (9th ISSP), Hammamet, Tunisia.

Prof. Najia Kbir-Ariguib, National Institute for Scientific and Technical Research, P.O. Box 95, Hammam-Lif, 2050 Tunisia.

Tel.: +216 1 430 215

Fax: +216 1 430 934

E-mail: ariguib@planet.tn

Chemical Education

5–10 August 2000

16th International Conference on Chemical Education: Chemistry for a Healthier Planet (16 ICCE), Budapest, Hungary.

Prof. Alajos Kalman, Chairman, Prof. Gabor Naray-Szabo, Department of Theoretical Chemistry, Lorand Eotvos University, Pazmany Peter st. 1b, H-1117 Budapest, Hungary.

Tel.: +36 1 209 0555, ext. 16-30

Fax: +36 1 209 0602

E-mail: mail2.mke@mtesz.hu

Chemical Thermodynamics

6–11 August 2000

16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, Canada.

Prof. M. A. White, Department of Chemistry, Dalhousie University, Halifax, Nova Scotia B3H 4J3, Canada.

Tel.: +1 902 494 3894

Fax: +1 902 494 1310

E-mail:

Mary.Anne.White@DAL.CA

How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsorship, conference organizers should complete an Advance Information Questionnaire (AIQ). The AIQ form is available at <http://www.iupac.org> or by request at the IUPAC Secretariat, and should be returned between 2 years and 12 months before the conference. Further information on granting sponsorship is included in the AIQ and available online.

Thermal Analysis and Calorimetry

14–18 August 2000
12th International Congress on Thermal Analysis and Calorimetry, Copenhagen, Denmark.
Dr. O. Toft Sorensen, Materials Research Department, Riso National Laboratory DK-4000, Roskilde, Denmark.
Tel.: +45 4677 5800
Fax: +45 4677 5758
E-mail: o.toft.sorensen@risoe.dk

Chemical Sensors

27–30 August 2000
EUROSENSORS XIV, the 14th European Conference on Solid-State Transducers, Copenhagen Denmark.
This conference has declined IUPAC sponsorship.

Biotechnology

3–8 September 2000
11th International Biotechnology Symposium, Berlin, Germany.
Prof. G. Kreysa, DECHEMA e.V.— c/o 11th IBS, Theodor-Heuss-Allee 25, 60486 Frankfurt/Main, Germany.
Tel.: +49 69 7564 235 / -249
Fax: +49 69 7564 176 / -304
E-mail: biotechnology2000@dechema.de

Nuclear and Radiochemistry

3–8 September 2000
5th International Conference on Nuclear and Radiochemistry (NRC5), Pontresina, Switzerland.
Prof. H. W. Gäggeler, Chairman, Mrs. R. Lorenzen, Secretary, Paul Scherrer Institut, CH-5232 Villigen-Ost, Switzerland.
Tel.: +41 56 310 2401
Fax: +41 56 310 4435
E-mail: ruth.lorenzen@psi.ch

Analytical Chemistry

3–9 September 2000
EUROANALYSIS XI, Lisboa, Portugal.
Prof. Maria Filomena Camões, Chair, Dr. Cristina Oliveira, Secretary, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade de Lisboa, Edifício C1-5^o Piso, P-1700 Lisboa, Portugal.
Tel.: +351 1 3906138
Fax: +351 1 3909352; 7500088
E-mail: euroanalysisxi@fc.ul.pt

Natural Products

4–8 September 2000
22nd International Symposium on the Chemistry of Natural Products, São Carlos, São Paulo, Brazil.
Dr. M. Fátima das G.F. da Silva, Universidade Federal de São Carlos, Depto. de Química, Via Washington Luiz, km 235, CP676, São Carlos, São Paulo, Brazil.
Tel.: +55 16 260 8208
Fax: +55 16 260 8350
E-mail: dmfs@power.ufscar.br

Medicinal Chemistry

18–22 September 2000
XVI International Symposium on Medicinal Chemistry, Bologna, Italy.
Prof. C. Melchiorre, Università di Bologna, Dipartimento di Scienze Farmaceutiche, Via Belmeloro 6, I-40126 Bologna, Italy.
Tel.: +39 051 259 706
Fax: +39 051 259 734
E-mail: camelch@alma.unibo.it

Trace Elements in Food

9–11 October 2000
Warsaw, Poland.
Prof. B. Szeke, Chairman, Dr. R. Jedrzejczak, Secretary, Institute of Agricultural and Food Biotechnology
ul. Rakowiecka 36
02-532 Warsaw, Poland.
Tel.: +48 22 606 3876
Fax: +48 22 4904 28
E-mail: jedrzejczak@ibprs.waw.pl

Food Packaging

8–10 November 2000
2nd International Symposium on Food Packaging—Ensuring the Safety and Quality Food, Vienna, Austria.
Liên-Anh Tran, ILSI Europe, 83, Avenue E. Mounier, Box 6, B-1200, Brussels, Belgium.
Tel.: +32 (2) 771 0014
Fax: +32 (2) 762 0044
E-mail: anh@ilsieurope.be

Polymers

20–24 November 2000
7th Latin-American Symposium on Polymers (SLAP'2000) and 5th Ibero American Congress on Polymers, Havana, Cuba.
Dr. Ricardo Martínez, Dr. Waldo Argüelles-Monal, IMRE, Universidad de La Habana La Habana 10400, Cuba.
Fax: +53 7 33 42 47
E-mail: slap@imre.oc.uh.cu

2001

Polymer Characterization

9–12 January 2001 **NEW**
9th International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.
Dr. Witold Brostow, Department of Materials Science, University of North Texas, Denton, Texas, 76203-5310 USA.
Tel.: +1 940 565 4358, -3262, or 4337
Fax: +1 940 565 4824

E-mail: brostow@unt.edu or
polychar@marta.phys.unt.edu

Chemistry and Chemical Engineering

16–20 April 2001

IV International Congress on Chemistry and XIII Caribbean Conference on Chemistry and Chemical Engineering, Havana, Cuba.

Prof. Alberto J. Núñez Sellés, Sociedad Cubana de Química, Ave 21&200, Atabey, Apdo. 16042, CP 11600, Havana, Cuba. Tel.: +537 218 178 Fax: +537 336 471 E-mail: cqf@infomed.sld.cu

CHEMRAWN XIV

9–13 June 2001

Chemrawn Conference—Toward Environmentally Benign Processes and Products, Boulder, Colorado, USA.

Dr. Dennis L. Hjeresen, Environmental Management Program, Los Alamos National Laboratory - Mail Stop J591, Los Alamos, NM 87545. Tel.: +1 505 665 7251 Fax: +1 505 665 8118 E-mail: dennish@lanl.gov

IUPAC 41st General Assembly

29 June–8 July 2001

Brisbane, Australia.

IUPAC Secretariat.

Tel.: +1 919 485 8700

Fax: +1 919 485 8706

E-mail: secretariat@iupac.org

IUPAC 38th Congress / World Chemistry Congress 2001

1–5 July 2001

Brisbane, Australia.

Congress Secretariat, P.O. Box 177, Red Hill Q 4054, Australia.

Tel.: +61 7 3368 2644

Fax: +61 7 3369 3731

E-mail: wcc2001@ccm.com.au

Coordination and Organometallic Chemistry of Germanium, Tin, and Lead

NEW

8–12 July 2001

10th International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin, and Lead, Talence, France.

Dr. B. Jousseume, Laboratoire de Chimie Organique et Organometallique, UMR 5802, Universite Bordeaux 1, 351 avenue de la Liberation, F-33405 Talence Cedex, France. Tel.: +33 (0) 5 56 84 64 43 Fax: +33 (0) 5 59 84 69 94 E-mail: b.jousseume@lcoo.u-bordeaux.fr

Scattering Methods and Polymers

9–12 July 2001

20th Discussion Conference on Scattering Methods for the Investigation of Polymers, Prague, Czech Republic.

Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovskeho nam. 2, CZ-162 06 Praha 6, Czech Republic.

Tel.: +420 2 204 0332

Fax: +420 2 367 981

E-mail: sympo@imc.cas.cz

Polymer Membranes

16–19 July 2001

41st Microsymposium on Polymer Membranes, Prague, Czech Republic.

Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovskeho nam. 2, CZ-162 06 Praha 6, Czech Republic.

Tel.: +420 2 204 03332

Fax: +420 2 367 981

E-mail: sympo@imc.cas.cz

Visas

It is a condition of sponsorship that organizers of meetings under the auspices of IUPAC, in considering the locations of such meetings, should take all possible steps to ensure the freedom of all bona fide chemists from throughout the world to attend irrespective of race, religion, or political philosophy. IUPAC sponsorship implies that entry visas will be granted to all bona fide chemists provided application is made not less than three months in advance. If a visa is not granted one month before the meeting, the IUPAC Secretariat should be notified without delay by the applicant.

Phosphorus Chemistry

29 July–3 August 2001

15th International Conference on Phosphorus Chemistry, Sendai, Japan.

Prof. Masaaki Yoshifuji, Department of Chemistry, Graduate School of Science, Tohoku University, Aoba, Sendai 980-8578, Japan.

Tel.: +81 22 217 6558

Fax: +81 22 217 6562

E-mail: yoshifuji@mail.cc.tohoku.ac.jp

Analytical Sciences

6–10 August 2001

International Congress on Analytical Sciences 2001 (ICAS2001), Tokyo, Japan.

Prof. Tsuguo Sawada, Chairman, Department of Applied Chemistry, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan.

Tel.: +81 3 5841 7236 (or 7237)

Fax: +81 3 5841 6037

E-mail: icas2001@laser.t.u-tokyo.ac.jp

Biodiversity

3–8 November 2001

3rd IUPAC International Conference on Biodiversity (ICOB-3), Antalya, Turkey.

Prof. B. Sener, Department of Pharmacognosy, Faculty of Pharmacy, Gazi University, P.O. Box 143 06572, Maltepe-Ankara, Turkey.

Tel.: +90 312 212 2267

Fax: +90 312 213 3921

E-mail: blgsener@tr-net.net.tr

Sweeteners

13–17 November 2001

2nd International Symposium on Sweeteners, Hiroshima-Shi, Japan.

Prof. Kasuo Yamasaki, Institute of Pharmaceutical Sciences, Faculty of Medicine, Hiroshima University Kasumi, Minami-ku, Hiroshima 734-8551, Japan.

Tel.: +81 82 257 5285

Fax: +81 82 257 5289

E-mail:

yamasaki@pharm.hiroshima-u.ac.jp

2002

Polymer Characterization

7–11 January 2002

10th International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.

Dr. Witold Brostow, Department of Materials Science, University of North Texas, Denton, Texas, 76203-5310 USA

Tel.: +1 940 565 4358, -3262, or 4337

Fax: +1 940 565 4824

E-mail: brostow@unt.edu or polychar@marta.phys.unt.edu

Bioorganic Chemistry

12–15 May 2002

6th International Symposium on Bioorganic Chemistry, Toronto, Canada.

Dr. Ronald Kluger, Department of Chemistry, University of Toronto, Toronto, Canada M5S 3H6.

Tel.: +1 416 978 3582

Fax.: +1 416 978 3482

E-mail:

rkluger@chem.utoronto.ca

Polymer Science and Technology

NEW

2–5 December 2002

IUPAC Polymer Conference on the Mission and Challenges of Polymer Science and Technology, Kyoto, Japan.

Prof. Seiichi Nakahama, Faculty of Engineering, Tokyo Institute of Technology, 2-12-1 Ohokayama, Meguro-ku, Tokyo 152-8552, Japan.

Tel.: +81 3 5734 2138

Fax.: +81 3 5734 2887

E-mail:

snakaham@polymer.titech.ac.jp

Chemistry International

2000, Vol. 22, No. 4 (July)

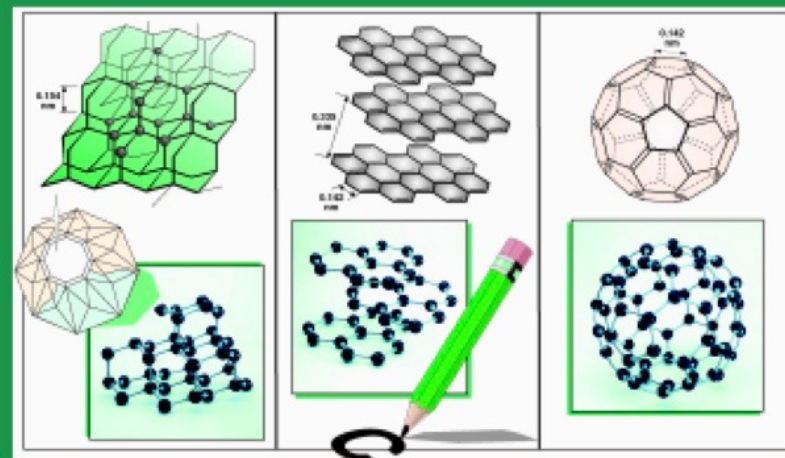


- 97 Chemistry in Argentina
- 102 News from IUPAC
- 102 Chemical Nomenclature Round Table
- 103 DIDACTic Tools for Teaching Chemistry
- 105 *Pure and Applied Chemistry*: The Special Topics Project
- 107 Symposia and Conferences in Developing and Economically Disadvantaged Countries
- 108 IUPAC-NIST Solubility Data Series
- 109 Report on IUPAC's Financial Condition for the Biennium 1998–1999
- 113 Reports from IUPAC-Sponsored Symposia
- 113 Reports from Commissions
- 114 Provisional Recommendations
- 115 Awards and Prizes
- 116 New Books and Publications
- 121 Conference Announcements
- 125 Conference Calendar

ISSN 0193-6484

Chemistry International

The news magazine of the International Union of
Pure and Applied Chemistry (IUPAC)



2000, Vol. 22, No. 4 (July)

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

PUBLICATIONS MANAGER: Alan J. Senzel
PRODUCTION EDITOR: Cheryl Wurzbacher

All correspondence to be addressed to The Editor, *Chemistry International* (CI), IUPAC Secretariat, P. O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Telephone: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: edit.ci@iupac.org and <http://www.iupac.org/publications/ci/>

Subscriptions

Six issues of *Chemistry International* (ISSN 0193-6484) will be published bimonthly in 2000 (one volume per annum) in January, March, May, July, September, and November. The 2000 subscription rate is USD 99.00 for organizations and USD 45.00 for individuals. Subscription orders may be placed directly with the IUPAC Secretariat. Affiliate Members receive CI as part of their Membership subscription, and Members of IUPAC bodies receive CI free of charge.

Reproduction of Articles

Unless there is a footnote to the contrary, reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original in *Chemistry International*.

Periodicals postage paid at Durham, NC 27709-9998 and additional mailing offices. POSTMASTER: Send address changes to *Chemistry International*, IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757.

Front cover: DIDACTic overhead transparency sheet depicting three different allotropic forms of carbon, illustrated by diamond, graphite, and fullerene. See article on page 103.

Printed by: Cadmus Journal Services, Easton, MD, USA

International Union of Pure and Applied Chemistry

International Union of Pure and Applied Chemistry (IUPAC)



President: A. HAYES (UK)
Vice President: P. S. STEYN (South Africa)
Past President: J. JORTNER (Israel)

Secretary General: E. D. BECKER (USA)
Treasurer: C. F. BUXTORF (Switzerland)

IUPAC Secretariat

P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Tel.: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: secretariat@iupac.org and <http://www.iupac.org>

The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary non-governmental, nonprofit association of organizations, each of which represents the chemists of a member country. Its objectives are as follows:

- to promote continuing cooperation among the chemists of the member countries
- to study topics of international importance to pure and applied chemistry which need standardization or codification
- to cooperate with other international organizations that deal with topics of a chemical nature
- to contribute to the advancement and understanding of pure and applied chemistry in all its aspects

The membership of IUPAC currently comprises 45 national organizations.

National Adhering Organizations

Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Österreichische Akademie der Wissenschaften (**Austria**)
Nationaal Comité voor Scheikunde/Comité National de Chimie (**Belgium**)
Brazilian Chemistry Committee for IUPAC (**Brazil**)
Bulgarian Academy of Sciences (**Bulgaria**)
National Research Council of Canada (**Canada**)
Sociedad Chilena de Química (**Chile**)
Chinese Chemical Society, Beijing (**China**)
Chemical Society located in Taipei (**China**)
Croatian Chemical Society (**Croatia**)
Czech National Committee for Chemistry (**Czech Republic**)
Det Kongelige Danske Videnskabernes Selskab (**Denmark**)
Academy of Scientific Research and Technology (**Egypt**)
Suomen Kemian Seura (**Finland**)
Comité National Français de la Chimie (**France**)
Deutscher Zentrallausschuss für Chemie (**Germany**)
Association of Greek Chemists (**Greece**)
Hungarian Academy of Sciences (**Hungary**)
Indian National Science Academy (**India**)
Royal Irish Academy (**Ireland**)
Israel Academy of Sciences and Humanities (**Israel**)
Consiglio Nazionale delle Ricerche (**Italy**)

Science Council of Japan (**Japan**)
Korean Chemical Society (**Korea**)
Kuwait Chemical Society (**Kuwait**)
Koninklijke Nederlandse Chemische Vereniging (**Netherlands**)
Royal Society of New Zealand (**New Zealand**)
Norsk Kjemisk Selskap (**Norway**)
Chemical Society of Pakistan (**Pakistan**)
Polska Akademia Nauk (**Poland**)
Sociedade Portuguesa de Química (**Portugal**)
Colegio de Químicos de Puerto Rico (**Puerto Rico**)
Russian Academy of Sciences (**Russia**)
King Abdulaziz City for Science and Technology (**Saudi Arabia**)
Slovak Chemical Society (**Slovakia**)
Slovenian Chemical Society (**Slovenia**)
National Research Foundation (**South Africa**)
Consejo Superior de Investigaciones Científicas (**Spain**)
Svenska Nationalkommittén för Kemi (**Sweden**)
Neue Schweizerische Chemische Gesellschaft (**Switzerland**)
Türkiye Kimya Dernegi (**Turkey**)
Royal Society of Chemistry (**United Kingdom**)
National Research Council, National Academy of Sciences (**USA**)
Union of Yugoslav Chemical Societies (**Yugoslavia**)

Chemistry in Argentina

This article was contributed by Prof. Máximo Barón (Facultad de Ciencias Exactas y Naturales, Universidad de Belgrano, Villanueva 1324, 1426 Buenos Aires, Argentina; E-mail: baron@ub.edu.ar; Tel.: +54 11 4511 4700; Fax: +54 11 4821 4887), Titular Member of IUPAC's Macromolecular Division Committee and Secretary of the Commission on Macromolecular Nomenclature (IV.1).

Introduction

In attempting to weave the tale of chemistry in Argentina, the main problem is the choice of an adequate frame of reference. Of the many possibilities, I have favored a historical approach; because science and technology are essentially historical processes, it seems to be the most appropriate choice. Therefore, this tale is divided into periods of varying length of time that I hope will give a clear picture of how chemistry activities today in Argentina came into being.

Pre-19th Century Chemistry

To establish the exact limits of chemistry's past in the area that is now Argentina is not an easy task, because the temptation to link this activity to Europeans, though understandable, is not fair. Although the indigenous population was not large by the time Europeans arrived in the 2nd and 3rd decades of the 16th century, the central and northern parts of the territory were provinces of the Inca empire. It is well known that the Incas were quite proficient in a number of activities related to chemistry, such as metallurgy, textile dyeing, pottery, etc. However, what could be called "the Argentine provinces" of this empire were actually frontier land and not only quite far from the center of power but also rather sparsely populated, so not much manufacturing took place.

Not much changed when the Europeans arrived, and the situation remained static for more than 200 years, mainly because the central powers in Spain prevented almost any activity that would imply the possibility of economic growth through industry or commerce. The few exceptions included silver and gold mining and some salting of cattle hides that were sent to the metropolis for tanning and subsequent manufacture of leather goods.

The large territory that included present-day Bolivia, Paraguay, Uruguay, and Argentina was actually divided into four provinces. These regions were ruled by governors sent by the Spanish crown, with no locally elected assemblies except small city coun-

cils whose members were chosen from the local Spanish upper class. The first important change came about in 1776 with the creation of the Viceroyalty of the River Plate. Cities and provinces thus gained a small measure of self-rule and, as a result, some important changes started taking place during the last decades of the 18th century. A printing press, which had belonged to the expelled Jesuits, was established for printing books—and even the first newspapers—and some enterprising locally born individuals began manufacturing goods. A soap-making plant was established within the city of Buenos Aires, the salting of hides for export became a thriving activity, some mining started to crop up in the interior provinces, and winemaking began in the central western region. But there were no schools in which to learn any trade, and whatever people were able to do was achieved by direct learning from those who had had some experience in the "old world" before coming to the colonies. Two of the reasons the Argentine National Congress of 1816 gave for declaring independence were the closure, on orders by the Madrid court, of a technical school opened in Buenos Aires in 1802 and the prohibition on sending young people to Europe to study chemistry so they could teach it when returning home. The justification offered by Madrid was that education and travel were "mere luxury items".

The idea of training young people in chemistry was by no means an idle thought. Quite to the contrary, as early as 1802, Dr. Cosme Argerich, a physician born in Buenos Aires who received his doctorate in medicine at the Royal School of Surgery of Barcelona, started a course in chemistry under the aegis of a colonial institution, the so-called "Protomedicato". The institution was responsible for certifying physicians (foreign-trained, of course) to practice medicine in the territory of the Viceroyalty. Also, between 1804 and 1806, Buenos Aires-born Hipólito Vieytes, the man who had started the soap factory, published a newspaper entitled *Semanario de Agricultura, Comercio, e Industria* (Agriculture, Commerce, and Industry Weekly). The publisher devoted many issues to a series of "Elements of Chemistry". Later, Vieytes became one of the founding fathers of Argentina, along with Dr. Argerich, who also organized medical services for the nascent armed forces and subsequently became their first Surgeon General.

For purposes of this narrative, this early era ended on 25 May 1810 when the vast territory that is now

Argentina started on its way toward self-rule and, ultimately, independence six years later. A long and bitter war with the metropolis ended only in 1824 on the Peruvian battleground of Ayacucho, but in the meantime changes gained momentum quite rapidly, and a new period got underway.

From Self-Rule and Independence to Political Strife: 1810 to 1875

In a land with no industrial tradition, the initial years were very difficult—in large part because the main city, Buenos Aires, was far from the center of commercial activity, and the seaways were dominated by European fleets. Some supplies needed for the war of independence came from abroad, but in the interior provinces—especially Mendoza—workshops were established to make explosives, forge rifles and guns, supply ammunition, and provide much of what was needed for the military expedition across the Andes that José de San Martín started in January 1817.

The war of independence was followed by a long period of civil strife that drained effort and human resources and stifled initiative. For a short period in the early 1820s, the situation seemed to improve, and this period appeared to be the dawn of a new life for the young country. The University of Buenos Aires was established; courses in mathematics, physics, and chemistry were taught by capable native and foreign teachers; and excellent laboratories were available for experimental work. Chemistry was taught by Dr. Manuel Moreno, then a recent graduate of the University of Maryland. Physics was in the able hands of Ottavio F. Mossotti, an Italian physicist and astronomer who started developing his ideas on dielectric phenomena while teaching in Buenos Aires. Both teachers had excellent experimental facilities because the local government had allocated funds upon the founding of the University of Buenos Aires for the purchase in Europe of two complete laboratories that were in full operation as early as 1826.

But this brief era of enlightenment was just a spark in the darkness; after 1835, ruthless internal strife followed for many years. Dawn came only after 1852 when the country finally got organized constitutionally. However, during the period between independence and constitutional organization, some steps were taken in the right direction. Sugar manufacturing was started in the province of Tucumán around 1821, salting of beef and hides began under the able supervision of European expert Antonio Cambaceres, who was hired for this purpose, and work on extraction of vegetable oils was attempted with some success. In the early 1860s, despite the

bitter war with Paraguay, chemistry started to become a part of national economic growth. It is interesting to note that the first patent granted under Law 111 of 1863 was for a soap-making process. At this time, railroads started to penetrate the interior, and communications improved in general so that the country was ready for the next period of progress.

Industry, Teaching, and Research: 1875 to 1935

This half-century witnessed the economic ascent of Argentina, taking it from a sparsely populated territory with little industrial activity to an active and growing society. Chemical enterprises were, of course, a part of this prosperity, and it is interesting to note the major enterprises.

Industry

The manufacture of carbon black for the sugar industry started in 1874 and in four years generated exports of 6000 tons. Meatpacking began in 1875 and produced, as a by-product, high-quality gelatin that was also soon exported. These early endeavors were followed in rapid succession by the manufacture of tannins, acetic acid from grape alcohol, ethyl alcohol from molasses, sulfuric acid, soda and potash, glass, carbon sulfide, hypochlorites, oil refining, nitric and hydrochloric acids, copper sulfate, and corn products. The 1895 census recorded 317 chemical plants in Argentina. A serious international financial crisis in the 1890s slowed down the boom in chemical manufacturing; however, it resumed after the turn of the century, and the 1914 census listed 567 chemical industries backed by both local and foreign capital. The period through 1935 brought substantial growth in heavy chemicals. The sulfuric acid (both through lead chambers and catalysis), oxygen and nitrogen, oil distillation products, pulp and paper, and chloro-soda (via electrolysis) industries all thrived.

Teaching

The teaching of chemistry became firmly established at the Universities of Córdoba, Buenos Aires, and La Plata. After several reorganizations, a school of chemistry was created in 1897 in the Facultad de Ciencias Exactas, Físicas y Naturales of the University of Buenos Aires, and it included a doctoral program that produced the first graduates in 1901. Although the doctoral degree in chemistry was considered essentially professional, a thesis was the final step and a *sine qua non* condition. This dissertation requirement implied the need to do research either at the university or in one of the national agencies that had laboratories, such as Obras Sanitarias de la Nación (National Water Works) or Oficinas



Prof. John J. Kyle (1838–1922), director of the first chemistry doctoral thesis in Argentina (1901).

Químicas Nacional y Municipal (National and Municipal Government Chemists). A similar system developed about the same time at the University of La Plata and later on with the creation of the Universities of Tucumán in the center north, Cuyo in the west, and Litoral on the Paraná River.

Research

During the first two decades of the 20th century, chemical research started both at Buenos Aires and La Plata under the direction of professors of inorganic and organic chemistry, and they published their results both locally and abroad. Such research was essentially limited to the universities and mostly focused in analytical and organic chemistry, natural products (vegetable and animal oils), some biochemistry, and a few attempts at inorganic and physical chemistry. There was no privately funded basic or applied research. Of particular interest are the contributions of Enrique V. Zappi (organic chemistry), Horacio Damianovich (one of the first scientists to obtain derivatives of noble gases), and Alfredo Sordelli (biochemistry).

Toward the end of this period, the Asociación Argentina para el Progreso de la Ciencia [Argentine Association for the Advancement of Science (AAPC)] was founded in Buenos Aires by a small group of visionary scientists active in physiology, biochemistry, and organic chemistry. By Law of Congress, the AAPC received a grant of one million pesos (equivalent to about USD 300 000 at the time) that was invested, and the revenues were used for scholarships and research grants. A substantial number of young graduates, who later became prominent in Argentine science, were able to get their careers started under this program. This initial government fund was increased in subsequent years,

with donations from private sources (both individual and corporate). In the late 1940s and early 1950s, the AAPC acted as a National Research Council supporting basic research in fields ranging from pure mathematics to technological applications.

In 1912, the Asociación Química Argentina [Argentine Chemical Association (AQA)] was founded in Buenos Aires and immediately started to publish its scientific journals, *Anales de la Sociedad Química Argentina*. Local sections of the AQA soon opened in other cities, especially in those near chemistry departments or schools of national universities. Owing to legal requirements, the name of the journal was later changed to *Anales de la Asociación Química Argentina*, and it is now published regularly with papers in both English and Spanish. A technical information magazine (*Industria y Química*) and a bulletin are also published, with the latter both in print and e-mail editions. The bylaws of the AQA mandated that a chemistry library be organized and supported, and from a modest beginning that library has grown into a substantial source of chemical reference materials. What began as a repository of books and journals (obtained by exchange) is now a high-tech information center that employs all modern means to gain access to the many forms of digitalized chemical information.

The AQA has seven active divisions: Teaching of Chemistry, Industrial Chemistry, Safety and Health Hazards in the Workplace, Physical Chemistry, Chromatography, Medicinal Chemistry, and Theoretical Chemistry. The AQA offers courses on a variety of subjects of interest to industry, organizes National Chemistry Congresses in alternate years, has an extensive awards program that includes recipients who range from recent graduates to distinguished chemists, and has been associated with IUPAC since 1931.

By 1935, with the economic crisis of the early 1930s nearly over, there were enough graduates at work in Argentine chemistry to take an active part in what was going to develop in the next half century when chemical industries were established in many regions of the country, product and process development became more and more frequent in many large and medium-sized industries, and research—both basic and applied—started to attract increasing interest.

The Era of Expansion: 1936–1975

Industry

Local and foreign investment strongly supported everything that happened in this period, during which there was important participation by the government—especially in what were called “mixed en-



Building that housed the first chair of chemistry in Argentina (1822–1835) and the first School of Chemistry in the University of Buenos Aires (1897).

terprises". This cooperation was important in heavy chemicals, steel mills, initial petrochemical enterprises, nonferrous metallurgy, and a variety of solvents, hydrogen peroxide, ammonia and derivatives, etc. Chemistry soon became a full-fledged part of the Argentine industrial scene and, although dependent in some cases on imported raw materials, it was able to fill many local needs and to begin producing exports to neighboring countries. This success was made possible by both local and foreign capital investment that was instrumental in starting not only industrial manufacturing works but also some industrial research as well as process and product development. Examples of the latter include ATANOR (hydrogen peroxide, solvents, formaldehyde, and pesticides), E. R. Squibb & Sons (which started an excellent research laboratory under Profs. Alfredo Sordelli and Venancio Deulofeu), ALBA S.A. (paints and varnishes), Duperial, Compañía Química, and many others.

Research in the Chemical Fields

One of the most important aspects of chemistry in Argentina during this period was the substantial expansion of basic research carried out in universities and at a variety of institutes. Instrumental to this expansion was the creation in 1958 of the National Research Council, whose organizer and president for many years, Prof. Bernardo A. Houssay, combined the qualities of a first-class scientist with those of an able and enterprising administrator. He had shared the Nobel Prize in Medicine and Physiology for 1947 with Gertrude Radnitz and Charles F. Cori.

Prof. Houssay had been one of the more active members of the AAPC who supported several initiatives considered crucial to achieving a solid and fruitful national scientific system. The three most important measures were probably creating a Na-

tional Research Council, establishing full-time professorships at national universities, and appointing a Secretary of Science and Technology at the Cabinet level.

The first two initiatives were successfully undertaken in 1958, while the third had to wait over a decade, until the distinguished cardiologist Prof. Alberto C. Taquini was appointed to the Cabinet position. However, by this time a number of research groups had been assembled and were very active and productive at several national universities that, in a rather short time, became veritable centers of excellence. They flourished in several regions both at universities, such as Buenos Aires with its well-known Schools of Chemistry at the Facultad de Ciencias Exactas y Naturales (Natural and Exact Sciences) and Farmacia y Bioquímica (Pharmacy and Biochemistry), La Plata with its Institutes of Physical and Organic Chemistry, Córdoba, Rosario, Santa Fé with its pioneering School of Chemical Engineering, Tucumán, the Center of the Province of Buenos Aires, Mendoza, Bahía Blanca, Mar del Plata, and San Luis, among others, and at research institutes with federal, provincial, municipal, and private funding, such as Instituto de Investigaciones Bioquímicas, Fundación Campomar where Dr. Luis Federico Leloir (winner of the Nobel Prize in Chemistry for 1970) worked, Instituto Superior de Investigaciones Físicoquímicas (INIFTA), Planta Piloto de Química–Universidad Nacional del Sur [Chemical Pilot Plant–University of Bahía Blanca (PLAPIQUI)], Comisión Nacional de Energía Atómica [National Atomic Energy Commission



Prof. Luis F. Leloir (1906–1987), winner of the 1970 Nobel Prize in Chemistry.

(CONEA)], Laboratorio de Ensayo de Materiales e Investigaciones Tecnológicas [Laboratory for Material Testing and Technological Research (LEMIT)], and Instituto Nacional de Tecnología Industrial [National Institute for Industrial Technology (INTI)].

All these efforts found substantial and continuing support from the National Research Council (Consejo Nacional de Investigaciones Científicas y Técnicas, or CONICET, as it is known popularly), which had a good start under Houssay's firm and enlightened leadership as president (reporting directly to the National Executive). The funds CONICET received from the national budget were used judiciously for broad and effective scholarship programs and for the funding of research at universities and institutes. To describe the many activities of CONICET and its impact on science in Argentina is, in fact, another story; suffice it to say here that its existence enabled Argentina to take a significant place on the scientific world scene, with chemistry as one of the most important fields.

Last Quarter of the 20th Century

Viewed under the UNIFOR International Industrial Classification of All Economic Activities (UN), chemistry has an important share that ranges from the production of starting materials for other industries (e.g., food, textiles, printing, construction, transportation, health care, packaging, etc.) to products for direct use both locally and for export (such as paints and varnishes, pharmaceuticals, surface active agents, plastics, pulp and paper products, pigments, metals, rubber, glass, resins, pesticides, and fertilizers).

Oil and petrochemistry deserve a separate commentary. Although Argentine petroleum deposits were first discovered near a Patagonian village in 1907 and later on in other Argentine regions (Salta, Jujuy, Mendoza, Neuquén, Santa Cruz, and Tierra del Fuego), oil and gas production from them satis-

fied the energy needs of only part of the local market. In the early 1940s, because of demand brought about by World War II, the Dirección Nacional de Fabricaciones Militares (National Military Industries Agency) built a toluene synthesis plant to manufacture raw material for explosives. But it was only in the late 1950s and early 1960s that petrochemistry came into its own, essentially because of an aggressive exploration and production program that provided oil and gas in adequate amounts. Argentine petrochemistry has now become a multimillion-dollar industry that produces olefins and polyolefins, methanol, fertilizers, styrene and polystyrene, ethylene and propylene oxides, aromatics, vinyl chloride and PVC, polyethylene terephthalate, acetone, and other ketones—for both local consumption and export. In 1998, total petrochemical production reached 3.3 million tons (MTons), of which 36% comprised basic products, 28% intermediates, and 36% end-products.

2000 and Beyond

Chemistry in Argentina has traveled a difficult and, at times, bumpy road with moments of great enthusiasm and others of acrid gloom. Both local and foreign capital have contributed to its birth and growth, spawning small to medium-sized (by international standards) companies that make almost every basic chemical needed by the market. But the ever-changing world economy and the peculiar evolution of chemical industries, with emphasis shifting back and forth from industrial products to revenues for shareholders on a worldwide scale, has created unexpected situations that a rather small market like Argentina has difficulties coping with.

Still, a new millennium is just around the corner, and the country has been through worse crises before. We can, therefore, look forward to the future with a hopeful heart.

News from IUPAC

Chemical Nomenclature Round Table

On 3 May 2000, IUPAC Executive Director John Jost (secretariat@iupac.org) and IUPAC Secretary General Edwin D. Becker (tbecker@nih.gov) sent the following message to IUPAC's Associate National Adhering Organizations, Associated Organizations, and Company Associates; to ICSU Unions; and to a number of chemical societies:

Chemical nomenclature has been a major core activity of IUPAC since its inception. In order to help develop a strategy for the Union's future work in nomenclature, including advances in computer-based aspects of nomenclature, IUPAC held a Round Table discussion on "Representations of Molecular Structure: Nomenclature and Its Alternatives" in Washington, DC on 10–11 March 2000. The meeting brought together 41 participants from 10 coun-

tries and included experts in organic, inorganic, biochemical, and macromolecular nomenclature; users of nomenclature in academia, industry, the patent, international trade, health and safety communities; journal editors and publishers; database providers; and software vendors. A detailed report of the conference, including 14 recommendations for IUPAC action, is available on the IUPAC web site at http://www.iupac.org/news/archives/2000/NRT_Report.html, or you can follow the links from the News & Notices page.

The IUPAC Executive Committee has already implemented three recommendations as follows:

1. An ad hoc Committee on Chemical Identity and Nomenclature Systems (CCINS) has been established, with Dr. Alan D. McNaught as Chairman. The CCINS will be responsible for developing



Upper left: Participants at the IUPAC Chemical Nomenclature Round Table meeting in Washington, DC in March 2000; upper right: Alan D. McNaught and Jonathan Goodman in discussion; lower left: Kenneth Cole, Alexander Lawson, Derek Maclean, and John Brennan in discussion; lower right: IUPAC President Alan Hayes (left) and American Chemical Society President Daryle H. Busch, who visited the IUPAC Executive Committee meeting held just before the March 2000 ACS Meeting in San Francisco.

systems for conventional and computer-based chemical nomenclature, cooperating with the four current nomenclature Commissions, coordinating interdisciplinary activities in the nomenclature field, and recommending to the Bureau long-range strategy on chemical nomenclature. It is expected that this body will provide the long-term central planning, management, and coordination of chemical nomenclature that would otherwise be lost when the Commissions are discontinued at the end of 2001.

2. A feasibility study of the Chemical Identifier project, to be managed by the CCINS, has been initiated. A "chemical identifier" is intended to be a meaningful alphanumeric text string that can uniquely identify a chemical compound and facilitate its handling in computer databases. This code would be the equivalent of an IUPAC systematic name but would be designed to be easily used by computers. The identifier could also include other information about the specific substance in question. Because there are several issues to be resolved, the participants in the Nomenclature Round Table recommended that the feasibility of the project and resolution of these issues be carried out as soon as possible by representatives of a wide range of interested parties. Drs. Stephen R. Heller and Steve Stein (NIST) were asked to recommend a list of individuals and groups that should be consulted initially and to propose a framework for addressing the issues.
3. IUPAC has agreed to play a lead role in representing the international chemistry communities in the development of Chemical Markup Language (CML), which is an extension of the more general XML (Extensible Markup Language) with special ability to handle chemical information. XML is a new standard being adopted by web publishers worldwide. It is expected to replace the current standard HTML over the next few years.

Chemistry International Strategy Development Committee

IUPAC President Alan Hayes has appointed a Strategy Development Committee for *Chemistry International* (CI), charged with the responsibility for developing a recommended mission and strategy for the magazine. Among other things, the committee is being asked to define CI's function within IUPAC and to relate its content to the general mission of the Union in a time of profound change.

Readers who have views on the material that has been or should be included in CI, on its organization or physical appearance and layout, or on its relationship to the mission of IUPAC, are urged to communicate with the Chairman of the Strategy Development Committee:

Dr. D. H. Michael Bowen
8609 Ewing Drive
Bethesda, Maryland 20817 USA
Tel./Fax: +1 (301) 530 5764
E-mail: m_bowen@acs.org

DIDACTic Tools for Teaching Chemistry

Carbon—you can talk about it many different ways; what would be yours? You can do your best and picture yourself as the latest avant-garde modernist painter (see Fig. 1), or simply use DIDAC (see Fig. 2, which illustrates diamond, graphite, and fullerene—three different allotropic forms of carbon).

Because chemistry is fun and teaching it is not always easy, Agfa-Gevaert N.V., Belgium, has developed and produced "didactic" tools such as the DIDAC overhead transparency sheets. For more than five years, Belgian chemistry teachers in several respected schools have been using DIDAC overhead sheets. In the past year, and with the impulse of the Belgian National Adhering Organization, IUPAC's Committee on Chemistry and Industry (COCI), and, more recently, IUPAC's Committee on Teaching of Chemistry (CTC) have recognized the value of this project, and are actively promoting these materials.

Via a collaboration with UNESCO, and after the

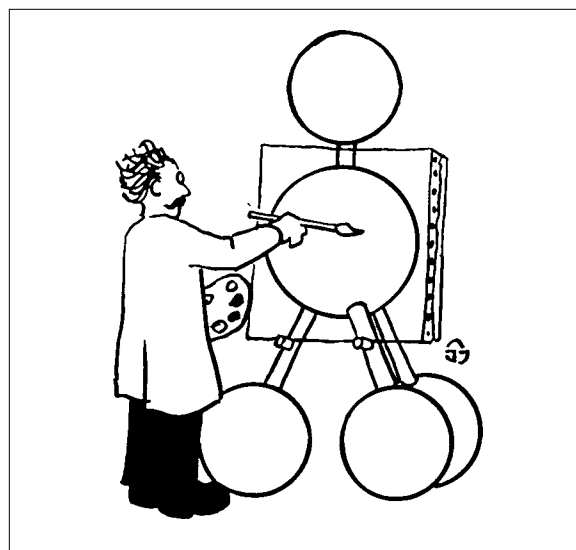


Fig. 1 Avant-garde modernist painter depicting a methane molecule.

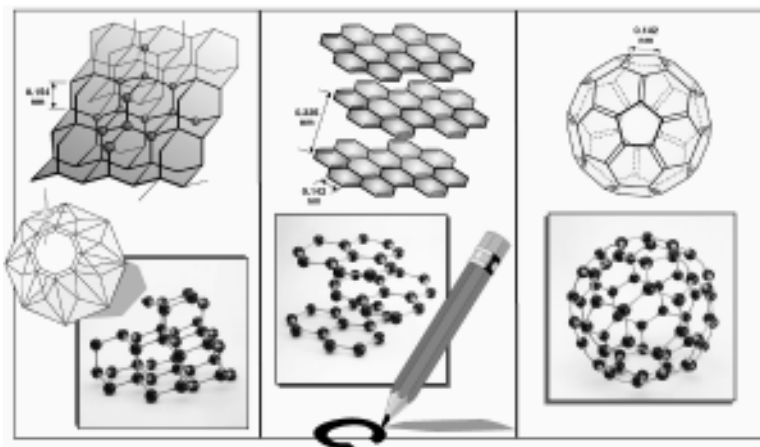


Fig. 2 Three different allotropic forms of carbon, illustrated by diamond, graphite, and fullerene.

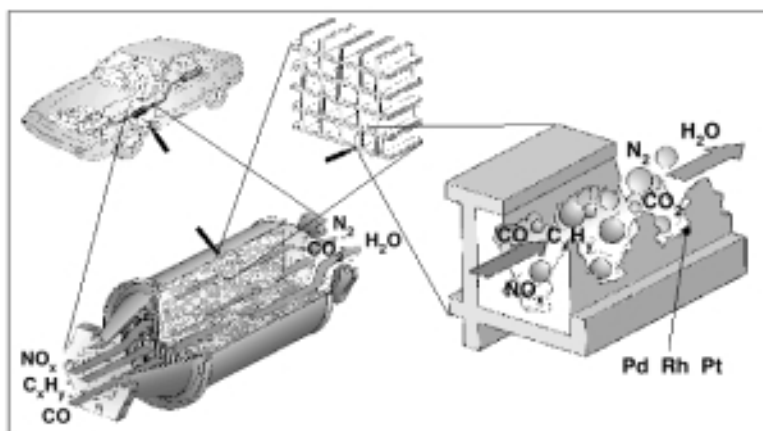


Fig. 3 Catalytic converters in cars.

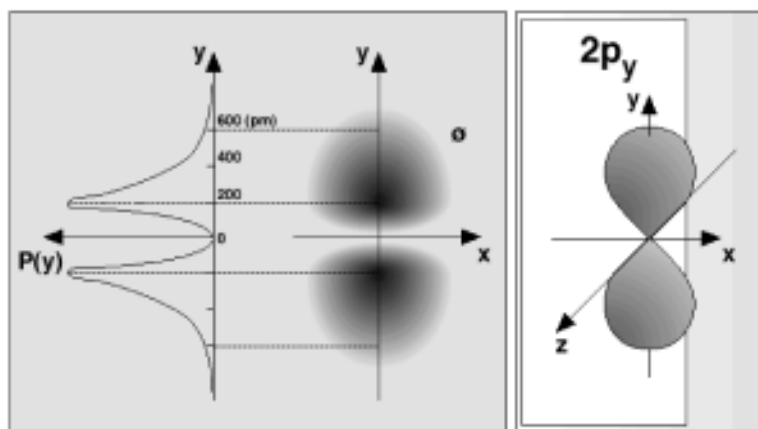


Fig. 4 A $2p_y$ orbital.

IUPAC Congress in Berlin in 1999, DIDAC material was presented at advanced teacher training courses during January–May 2000 in Libya, Mali, Burkina Faso, Belarus, Lithuania, Yemen, Niger, and Iran. By the end of this year, at least 10 more new training activities will be organized in Africa, Europe, and the Caribbean countries; these training activities also

feature a workshop on microchemistry organized by CTC. By the end of 2001, the project should be presented in more than 30 countries around the world. The international recognition of DIDAC should be easy because only simple facilities are required for the different levels and different curricula.

As one chemistry teacher put it, “Sometimes it can be awfully difficult to explain a chemical subject by drawing an illustrative picture on the blackboard. Especially when you need three-dimensional drawings, or you are dealing with topics like chemical bonds, equilibria, etc. It is so much more relaxing if you already have the illustration on an overhead sheet, as you then can concentrate on explaining the concept. And that is exactly why I use DIDAC transparencies in my lessons”.

When designing the sheets, the topics that are difficult to illustrate on a blackboard first came to mind. The carefully devised, attractive graphical representations help students to visualize the concepts and understand the theory. The sheets do not include narrative text, which make them accessible regardless of the language spoken in class. The sheets are designed for every level; the teacher selects only the sheets that provide added value to the lesson and match the level of the students in each class. Accompanying explanations for the teacher are available in Dutch, French, and English. The sheets are not meant to replace a course book, but merely to help explain topics that are rather difficult to illustrate.

Contents

Five kits are currently available. Each illustrates several common chemical subjects, from the role of chemistry in our daily lives to basic theoretical concepts. Each teaching module consists of approximately 60 color transparencies and presents chemical concepts in an easy-to-understand way. A black-and-white version of the transparencies, from which copies can be made, is included for the students. For example, Fig. 3 illus-

trates catalytic converters in cars, and Fig. 4 depicts a $2p_y$ orbital.

Volume 1

Role of chemistry in our daily lives (10 sheets)
Water (8 sheets)
Periodic table of the elements (31 sheets)
Colloidal systems (7 sheets)
Thermodynamics (14 sheets)

Volume 2

Chemical equilibria (27 sheets)
Petrochemistry (16 sheets)
Silverhalide photography (17 sheets + 3 wedges)

Volume 3

Electrochemistry (22 sheets)
Air and water (19 sheets)
Atomic models (21 sheets)

Volume 4

Polymers (28 sheets)
Biopolymers (25 sheets)
Chemical bonds (26 sheets)

Volume 5

Separation techniques (19 sheets)
Chemistry and health (19 sheets)

The content is specifically designed for students in secondary and higher education. As each sheet is autonomous, the teacher can use only the sheets that are applicable to their students and match their level. Thus, teachers still have complete freedom to design lessons in the way they feel is best for their class.

High Pedagogical Value

The DIDAC editorial team consisted of Agfa chemists and an interuniversity group of professors and teachers from several Flemish universities, colleges, and didactic centers. This team ensured the educational value of each set of overhead sheets. They also selected the topics that were to be addressed in consultation with teachers, and in relation to the curriculum of secondary schools and colleges. The accompanying explanations provided with each teaching module constitute a valuable support for pre-service and in-service teacher training. The DIDAC editorial team welcomes any comments and suggestions from the chemistry community.

www.agfa.com/didac/

The DIDAC web site presents detailed contents of each volume. Sample sheets can be viewed there in color and as they will appear on an overhead pro-

jector. Price and ordering information are also available on the DIDAC web site, or you may contact the IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA; Tel: +1 919 485 8700; Fax: +1 919 485 8706; E-mail: secretariat@iupac.org; URL: <http://www.iupac.org> or specifically for DIDAC: http://www.iupac.org/divisions/current_projects/1998/022_17_98.html.

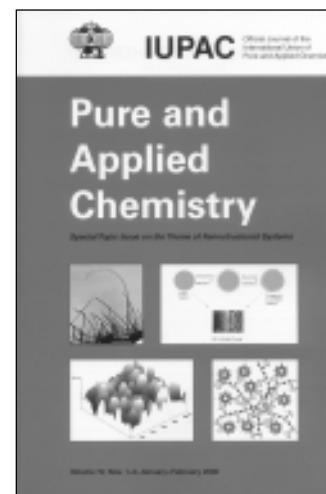
Pure and Applied Chemistry: The Special Topics Project

Prof. James R. Bull (Department of Chemistry, University of Cape Town, Rondebosch 7701, South Africa; E-mail: special.pac@iupac.org), IUPAC Special Topics Editor, has submitted the following article:

Background

The special topics project has its origins in a series of one-off issues of *Pure and Applied Chemistry* (PAC) published during recent years. These issues comprised collections of critical reviews on aspects of pure and applied chemistry that were deemed to be of compelling public interest, and were instrumental in broadening the readership base of the journal and publicizing the role of IUPAC in interdisciplinary ventures. As a consequence, a decision has been taken by the Executive Committee to introduce the concept as a regular feature of PAC. This innovation is intended to find expression in publication of thematically related collections of papers, as before, and occasional stand-alone review articles. These features will complement the traditional role of PAC as a medium for publishing articles based upon plenary lectures of IUPAC-sponsored events and reports and recommendations generated by the activities of IUPAC Commissions, and they are intended to supersede some of those special publication ventures formerly referred to by terms such as "White Book", etc.

The publication of a first issue of the journal under this new dispensation (PAC, Vol. 72, Nos. 1–2, pp. 1–331, 2000), is devoted to a collection of short critical reviews and research papers arising from presentations made at the first IUPAC-sponsored Work-



shop in the series "New Directions in Chemistry". This event was conducted at Hong Kong University on 14–18 July 1999, and the topic "Nanostructured Materials" offered an ideal model for the special topics initiative, because it reflects an emerging interdisciplinary branch of science in which hitherto unimagined new opportunities for future development and exploitation of molecular structure and properties are under investigation and in prospect. The resultant exciting mix of current discovery and future promise perfectly exemplifies the themes that should enjoy high priority in this new publication venture.

What Is the Purpose of Special Topics?

The concept of special topics should be considered in the context of the status and future prospects of *PAC*, and its role in the global business of scientific publications. The traditional uniqueness of the journal, as an "official" scientific organ of IUPAC, through publication of outputs from organizationally sponsored conferences, and deliberations on nomenclature and symbols, is no longer a guarantee of widespread obligatory readership in the international scientific community. The distinctiveness of this role has been diminished by growth of alternative forms of access to information and review material, and the inevitable replication of published versions of conference proceedings or topics accompanying the massive proliferation of review media. Furthermore, these organizational constraints on publication policy have hitherto obliged the journal to adopt a reactive role that competes unfavorably with the more market-sensitive editorial policies of numerous comparable publications.

Simply expressed, the special topics initiative is designed to introduce a new dimension of relevance and immediacy into the publication policy of *PAC*, and to reflect the responsiveness of IUPAC to the new challenges facing science in society. At the same time, it will target opportunities to demonstrate and exemplify the centrality of IUPAC as an authentic voice of the international community of chemists. Societal and regional diversity is one of the distinctive characteristics of the organization, and the special topics project will be guided by initiatives that reflect and foster this principle.

What Are Special Topics?

The term "special topics" implies something out of the ordinary but can comprise the publishable output of any legitimate activity of IUPAC, and reflect any aspect of current and future-directed chemical sciences. In reality, this initiative merely extends the current scope of *PAC* publication policy from the traditional, reactive role to a more flexible and dynamic

approach, in which IUPAC members and interest groups can propose and undertake projects leading to publication of feature articles and collections of thematically related reviews. The concept can certainly be extended to include collections sometimes referred to as "symposia-in-print", comprising overviews together with research papers. In all special topics projects, the essential criteria governing publishability will, therefore, be peer-review evaluation of scientific merit and aspirations toward IUPAC "distinctiveness". It is hoped that the application of these criteria will ensure that *PAC* occupies a unique and indispensable place in the ever-proliferating review literature, which complements those of comparable publications.

How Are Special Topics Projects Initiated and Implemented?

The task of the Special Topics Editor is to seek out and encourage the formulation of projects leading to publication of special topics, and to provide the appropriate technical support and liaison to bring the projects to conclusion.

A proposal for a special issue should first be submitted to the Special Topics Editor, and should outline the intended scope and coverage of a theme, together with a draft proposal on prospective authorship and a target date for publication. Ideally, a project editor (or editors) should be nominated to take responsibility for ensuring that the appropriate level of scientific rigor is brought to bear on the content of the proposed special topic issue.

It is perhaps worth emphasizing that the role of the Special Topics Editor is essentially that of a facilitator, and in no way usurps the central function and responsibility of the project editor(s), whose task it is to ensure that contributions are thematically appropriate and scientifically rigorous. In practice, this necessitates a central role for the project editor(s) in advising on referees and refereeing procedures, and ensuring that manuscripts are appropriately revised. In addition, the project editor(s) will assume or delegate responsibility for drafting introductory and/or summary material for incorporation into the special topic issue, where these are necessary.

The Special Topics Editor's first role in a defined project will be to establish communications with prospective authors and notify them of guidelines for manuscript preparation and a timetable for submission of manuscripts. Manuscripts will be submitted to the Special Topics Editor, who will implement and coordinate the refereeing process in close collaboration with the project editor, and liaise with the IUPAC publications office on communications and

manuscript management. The Special Topics Editor will also assume responsibility for ensuring overall consistency in the scientific standard and style of the issue, in consultation with the various project participants.

Who Should Participate?

The activities and projects of IUPAC Divisions provide natural outlets for joint ventures, which may well be candidates for special topic publications of *PAC*. Individuals and interest groups serving on IUPAC bodies are urged to take advantage of opportunities to promote their areas of specialized interest and expertise through this medium.

In addition, the Special Topics Editor will welcome proposals for authorship of stand-alone feature articles, intended to capture the essence of those new and emerging concepts and principles that may be expected to wield a major influence in the chemical sciences during the next decade and more. In addition to welcoming nominations for authorship, the Special Topics Editor will consider topic proposals submitted directly by would-be authors. These proposals should take the form of a short outline of the suggested topic, and its perceived appropriateness as a feature article in *PAC*. Proposals of this nature may be subject to peer evaluation, prior to the issue of a formal invitation to submit a manuscript.

Symposia and Conferences in Developing and Economically Disadvantaged Countries

In August 1999 in Berlin, the IUPAC Council approved a program (for a four-year trial period) of providing financial support of up to USD 10 000 to no more than two international conferences each year to be held in developing or economically disadvantaged countries that are full Members of IUPAC in good standing. IUPAC funds are to be used to pay international travel expenses of eminent invited lecturers whose participation will be critical to the success of the conference. An announcement of the program and invitation for applications follows.

The announcement and application forms are available on the IUPAC web site. The Bureau has not prepared a list of countries that are specifically eligible because the criteria of “developing” and “economically disadvantaged” are not firm, and economic circumstances (including currency exchange rates) often vary rather rapidly. IUPAC invites applications widely and leaves it up to the conference organizers making the application to provide adequate justification to the selection committee,

which comprises members of the Bureau.

As indicated in the announcement, an application should be submitted to the Secretariat, preferably in electronic form, with a copy to the relevant National Adhering Organization (NAO). Because the program is just beginning, IUPAC will accept applications this year until August 31 for conferences in 2001, but the normal application deadline will be January 31 of the year preceding the conference, as indicated in the announcement.

Please consult the IUPAC web site or contact the Secretariat for further information or advice.

Announcement

The International Union of Pure and Applied Chemistry (IUPAC) will provide financial support for international symposia and conferences in the chemical sciences that have been granted IUPAC sponsorship and are being held in developing and economically disadvantaged countries. The country in which the conference is being held must be a Member of IUPAC. IUPAC is able to provide financial support to no more than two conferences per year with up to USD 10 000 each, the funds to be used to pay for international travel of eminent invited conference speakers. Applications must be received by the IUPAC Secretariat according to the following schedule:

<i>Year of Conference</i>	<i>Application Due</i>	<i>Approval Granted</i>
2001	31 August 2000	31 October 2000
2002	31 January 2001	30 April 2001
2003	31 January 2002	30 April 2002
2004	31 January 2003	30 April 2003

Applications received after the deadline will be considered only if funds are still available.

Purpose

As part of its efforts to strengthen the chemical sciences worldwide, IUPAC wishes to encourage high quality conferences in developing countries and in countries that have great difficulty in supporting the international travel of conference lecturers because of national economic circumstances. The aims are to stimulate scientific activities in the host country and especially to permit young scientists in the host country to meet and interact with leading scientists from other parts of the world.

Eligibility

The program is limited to conferences to be held in countries that are full Members of IUPAC (currently 45 countries, as listed on the IUPAC web site). Countries must be in good standing at the time of appli-

cation. Conference organizers in any of the IUPAC Member countries may apply but must demonstrate that the country's economic circumstances meet the criteria for this program. Conferences must be truly international in scope and have been granted IUPAC sponsorship. They should be expected to attract speakers and participants from several countries.

Funding Restrictions

It is expected that the conference organizers will obtain adequate financial support within the host country and/or from registration fees to meet most needs. The funds provided by IUPAC are limited to payment of international travel for eminent invited speakers whose participation is crucial to the development of a high-quality scientific program.

Selection Criteria

Conferences on any aspects of the chemical sciences will be evaluated on the basis of the quality of the planned scientific program, the overall organization of the conference, the anticipated impact within the host country, the expected impact on international science, and the economic need as described above. Factors to be considered include relevance to important new areas of science and/or relevance to a specific geographic region. Innovative approaches are encouraged.

Application Procedure

Applications should be submitted to the IUPAC Secretariat, together with an Advance Information Questionnaire (AIQ) required for IUPAC sponsorship of a conference. Submission of both documents in electronic form is strongly preferred. Copies of both forms are available for downloading on the IUPAC web site, <http://www.iupac.org/symposia/support.html>. Supplementary material may be sent by air mail.

The items on both forms are largely self-explanatory. The Secretariat should be consulted if there are questions. Particular attention should be given to providing as complete a description of the planned conference as possible, including its aims, scope, and as detailed a scientific program as is available. The names of probable invited speakers should be given, along with details of the planned use of the IUPAC funds to support speakers' international travel and the reasons why such funds are important to the success of the conference. An overall budget for the conference should be provided, with indications of the probable sources of funds. In line with the policy for IUPAC sponsorship of conferences, it is expected that plenary and invited lectures will be made available for publication in *Pure*

and *Applied Chemistry*. Explain any requests for deviation from this policy.

A copy of the application should be submitted to the relevant NAO (addresses appear on the IUPAC web site).

Please send completed applications and AIQs to the IUPAC Secretariat:

E-mail (preferred): pam@iupac.org

Mail: IUPAC Secretariat
Attn: Ms. Pamela Footman
P.O. Box 13757
Research Triangle Park, NC 27709-3757
USA

Tel.: +1 919 485 8700

Fax: +1 919 485 8706

IUPAC-NIST Solubility Data Series

Three more volumes in the IUPAC-NIST Solubility Data Series have recently been published as issues of the *Journal of Physical and Chemical Reference Data (JPCRD)*, as per the cooperative agreement described in *Chemistry International*, Vol. 21, No. 2, pp. 36–37, 1999. These volumes have been published by The American Chemical Society (ACS) and the American Institute of Physics (AIP) for the National Institute of Standards and Technology (NIST).

IUPAC-NIST Solubility Data Series 67. Halogenated Ethanes and Ethenes with Water, by Ari L. Horvath, Forrest W. Getzen, and Z. Maczynska, appeared as Reprint No. 559, *JPCRD*, Vol. 28, No. 2, pp. 395–627, 1999.

IUPAC-NIST Solubility Data Series 68. Aliphatic Compounds C_3 – C_{14} with Water, by Ari L. Horvath and Forrest W. Getzen, appeared as Reprint No. 560, *JPCRD*, Vol. 28, No. 3, pp. 649–777, 1999.

IUPAC-NIST Solubility Data Series 69. Ternary Alcohol–Hydrocarbon–Water Systems, by Adam Skrzecz, David Shaw, and Andrzej Maczynski, appeared as Reprint No. 566, *JPCRD*, Vol. 28, No. 4, pp. 983–1236, 1999.

For more information about these IUPAC-NIST volumes, see the article on New Publications from the American Chemical Society and the American Institute of Physics on page 118 of this issue.

Report on IUPAC's Financial Condition for the Biennium 1998–1999

After serving IUPAC as Treasurer and Chairman of the Finance Committee for eight years, Prof. John Ward has taken a well-deserved retirement from the financial helm of IUPAC. During his term, IUPAC's financial condition improved from a position of income not meeting expenses in the biennium to a position during the 1998–1999 biennium in which income covered expenses and long-term reserves have been established to strong levels. Financial responsibilities have transferred to Dr. Christoph



Dr. Christoph Buxtorf

comments are based on the financial figures summarized in the tables that are part of this report. More detailed financial statements can be found on the IUPAC web site at: <http://www.iupac.org>. The comments are summarized in two categories: near-term operational income/expense and long-term investments.

Near-Term Operational Income and Expense

Over the past biennium, IUPAC income has exceeded expenses by USD 373 500, an amount that was significantly greater than in the previous biennium (1996–1997) when income exceeded expenses by USD 20 600. Much of the surplus from these years has been moved to our long-term investment accounts, where it has been earning a good return for potential use to support the organization's projects.

The surplus during the past biennium is the result of a number of factors, including: (1) a more efficient operation of the Secretariat at Research Triangle Park, (2) stronger fiscal management of expenses by Divisions and Standing Committees, and (3) tight fiscal management by our Treasurer.

The impending reorganization of the work done by IUPAC may have also caused some reduction in spending during this millennium. As the new project system gets established, it is anticipated that expenses and income will be more closely matched.

There are some cautions and concerns to be noted, however, as we view IUPAC's operational financial condition. On the income side, our national subscriptions provide slightly over 50% of our operating income. This income represents the main support of our organization; however, it is subject to monetary fluctuations and regional macroeconomic problems that regularly impact the organization. For example, countries where severe inflation has caused hardships are not able to meet their annual subscription because inflation has diminished the value of their currencies. Such circumstances are recognized and handled on a temporary basis by the Officers of the Union in a way that does not impact the participation of the countries in IUPAC activities. However, such occurrences do impact IUPAC's budgeted income levels. This effect has occurred in the recent past, and IUPAC's financial plans must take the possibility of such events into account.

Another major contributor to our biennial income is IUPAC publications. During the past biennium, publication income provided approximately 33% of the total income.

IUPAC, under the leadership of our Executive Director, Dr. John Jost, has moved in the direction of self-publishing. This change has improved the response time for IUPAC publications and has also resulted in a significant improvement in income. One caution in the longer term is whether printed publications will continue to provide such income levels, given the trend toward electronic publication and use of the excellent IUPAC web site.



Dr. Edwin Przybylowicz

The third major contributor to IUPAC income derives from dividends and interest. During the past biennium, these sources have contributed 9%, down slightly from the 10% of the previous biennium. This item is mainly determined by the Union's average cash position and the prevailing interest rates.

On the expense side, total expenses for this biennium are down by 8% over the previous biennium, during which the Secretariat was moved from Oxford, England to Research Triangle Park, North Carolina (USA). While this move had a significant impact on our operations, it did not impact the scientific work of the organization. Prof. Ward regularly reminded the Division Presidents and Standing Committee Chairs of the availability of funding for worthy projects.

It will be a challenging task to select and support projects under the Strategic Plan 2000–2001. IUPAC will undergo a fundamental strategic change in the years ahead, from a commission-based to a project-driven “new millennium” organization. The challenge for financial planning will be to provide the necessary support for good projects as well as an equitable distribution of funds across the broad spectrum of activities in which IUPAC is involved.

Long-Term Investments

Long-term investments for IUPAC are subdivided into four funds: (1) Reserve Fund, (2) Southern Hemisphere Sinking Fund, (3) Endowment Fund, and (4) Endowment Fund Reserve. While the accounting practice shows specific amounts of money allocated to each of these funds, for investment purposes, the aggregate of the four funds is handled as a single portfolio. The purpose of each of these funds is as follows:

Reserve Fund

This fund is intended to provide operational expenses to carry IUPAC for a full biennium, should

BACHELOR, TILLERY & ROBERTS, LLP
CERTIFIED PUBLIC ACCOUNTANTS
POST OFFICE BOX 18068
RALEIGH, NORTH CAROLINA 27619

RONALD A. BACHELOR
ANN E. TILLERY
FRANKLIN T. ROBERTS
GREGORY E. BRILEY
WM. JAMES BLACK, JR.

4700 HOMEWOOD COURT, SUITE 300
RALEIGH, NORTH CAROLINA 27609
TELEPHONE (919) 787-8212
FACSIMILE (919) 783-6724

Independent Auditors' Report

The Executive Committee
International Union of Pure and Applied Chemistry:

We have audited the accompanying statements of financial position of the International Union of Pure and Applied Chemistry ("IUPAC") as of December 31, 1999 and 1998, and the related statements of activities, cash flows, and functional expenses for the years then ended. These financial statements are the responsibility of IUPAC's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the International Union of Pure and Applied Chemistry as of December 31, 1999 and 1998, and the changes in its net assets and its cash flows for the years then ended in conformity with generally accepted accounting principles.

Bachelor, Tillery & Roberts, LLP

February 24, 2000

other sources of income not be forthcoming. It is the prime financial protection for the Union in the event of a severe worldwide economic downturn.

Southern Hemisphere Sinking Fund

This fund is one that is planned to be used to help hold General Assembly and Congress meetings in places where the costs of travel, meeting arrangements, etc. are considerably more expensive than the norm. It is anticipated that significant use of this fund will be made during the upcoming General Assembly and Congress in Brisbane, Australia.

Endowment Fund

This fund was established to pay for special projects of a broad nature that enhance the stature of the Union. For example, the recently established IUPAC Prize for Young Chemists will be supported entirely by the proceeds from the Endowment Fund. Proceeds from this fund are calculated using the yield on fixed income investments rather than the entire portfolio.

Endowment Fund Reserve

This fund was created to provide matching funds from IUPAC to add to outside funds that might be made available to IUPAC for endowment purposes. The Endowment Fund Reserve would match funding for projects of an ongoing nature from partnerships of IUPAC with industry, government, or technical organizations.

Total IUPAC Portfolio Growth

The total IUPAC investment portfolio grew from a value of USD 3 055 920 at the end of the previous biennium (market value as of 31 December 1997) to USD 3 940 707 (market value as of 31 December 1999) for a 29% gain in value. This change is the result of two factors: (1) the investment growth of the portfolio

during this period, and (2) savings that were accrued from operations during this period and transferred to the long-term investment account. During the past biennium, the Finance Committee and Treasurer have established a balanced portfolio of 60% equities and 40% fixed income investments, with a regional balance of 60% U.S. investments and 40% in Europe.

During the next year, the Finance Committee will develop a written investment policy statement, which will be reviewed and approved regularly by Officers of the Union, as a means of understanding and maintaining IUPAC's strong financial condition.

Investment Account (in USD)	Market Value 12/31/97	Market Value 12/31/98	Market Value 12/31/99
Reserve Fund	2 172 515	2 500 837	2 860 943
Southern Hemisphere Sinking Fund	100 000	150 000	200 000
Endowment Fund	343 800	563 603	632 926
Endowment Fund Reserve	439 605	219 802	246 838
Total Long Term Portfolio Value	3 055 920	3 434 242	3 940 707
Annual Percentage Change in Value		12.4%	14.7%
Biennium Percentage Change in Value			29.0%

Budget vs. Expense 1998–99 (USD, thousands)

	1998–99 Biennium (Actual)	1998–99 Biennium (Budget)	1998–99 Biennium (Over/Under)	1996–97 Biennium (Actual)
INCOME				
National Subscriptions	1 332.7	1 350.0	(17.3)	1 278.1
Service Charges	15.5	25.0	(9.6)	17.5
Interest & Dividends Earned	193.4	220.0	(26.6)	249.5
Other Income/Restricted Income	64.2	22.0	42.2	10.3
	1 605.8	1 617.0	(11.3)	1 555.4
Publications				
Blackwell	762.9	650.0	112.9	669.4
Other Publishers	57.2	20.0	37.2	27.8
Blackwell Science Grant	40.0	40.0	-	40.0
	860.1	710.0	150.1	737.2
Affiliate Membership Program				
Contributions	133.4	110.0	23.4	139.9
Royalties-Blackwell	-	2.0	(2.0)	3.0
Ties & scarves	0.3	0.2	0.1	0.3
	133.7	112.2	21.5	143.2
Total Income	2 599.4	2 439.2	160.3	2 435.8

Budget vs. Expense 1998–99 (USD, thousands) (continued)

	1998–99 Biennium (Actual)	1998–99 Biennium (Budget)	1998–99 Biennium (Over/Under)	1996–97 Biennium (Actual)
EXPENSE				
Governance Expense				
Officers	33.1	16.0	17.1	6.0
Restructuring Activities	7.1	-	7.1	51.5
Relocation of Secretariat	-	-	-	187.7
Contributions to ICSU	46.9	45.0	1.9	42.6
Total (Governance)	87.1	61.0	26.1	287.8
Administrative Expense				
Secretariat (General)	709.8	684.2	25.6	599.9
Accounting, Audit & Bank Fees	64.9	30.0	34.9	43.8
Other expense	24.1	-	24.1	43.0
Handbook	20.5	17.0	3.5	14.9
Total (General)	819.3	731.2	88.1	701.6
Secretariat (Publications)	1.5	-	1.5	285.5
Misc. Exp.	23.9	60.0	(36.1)	61.4
Total (Publications)	25.4	60.0	(34.6)	346.9
Secretariat (AMP& Fellows)	-	-	-	28.7
CI & leaflets	90.8	100.0	(9.2)	99.3
Misc. Exp.	4.0	8.0	(4.0)	7.4
Total (AMP & Fellows)	94.8	108.0	(13.2)	135.4
Total Secretariat (w/o Acctng. Trans.)	939.5	899.2	40.2	1 183.9
Accounting Transactions				
Depreciation, etc.	21.2	40.0	(18.8)	33.8
Foreign Exchange Diff.	0.8	-	0.8	(3.5)
Bad Debts Provision	16.8	-	16.8	(9.1)
Total (Accounting Transactions)	38.8	40.0	(1.2)	21.2
Total Secretariat (w/ Acctng. Trans.)	978.3	939.2	39.0	1 205.1
Operations Expense				
Standing Committees	138.8	163.5	(24.7)	120.1
Divisions & Sections	401.8	418.5	(16.7)	319.4
Special Projects	37.3	26.0	11.3	-
Chem. Weapons	4.7	18.0	(13.3)	-
Chem. Intl. for Members	37.7	46.0	(8.3)	44.4
General Assembly	464.7	510.0	(45.3)	425.4
Representatives on Other Orgs.	20.8	21.0	(0.2)	12.8
Contingencies	-	60.0	(60.0)	-
Total (Operations)	1 105.8	1 263.0	(157.2)	922.1
Restricted Expenses (CHEMRAWN, ICSU, JCAMP, UNESCO)	54.9	-	54.9	-
Total Expense	2 226.1	2 263.2	(37.2)	2 415.0
Net Income (Expense)	373.3	176.0	197.5	20.8

Reports from IUPAC-Sponsored Symposia

12th International Symposium on Carotenoids, 18–23 July 1999, Cairns, Australia

This meeting was the first symposium held under the auspices of the International Carotenoid Society (<http://www.carotenoid.uconn.edu>), and also the first time the symposium has been held in the Southern Hemisphere. Nevertheless, it is the latest in a long and distinguished series of meetings on carotenoids that began under IUPAC sponsorship with a small symposium held in Trondheim, Norway in 1966. As interest in this fascinating family of molecules has increased over the years, so has attendance at the symposia. At the 11th symposium, held in Leiden, The Netherlands, in 1996, it was realized that the field of carotenoid science was broad and diverse enough to justify an international society devoted to its promulgation. The International Carotenoid Society was inaugurated at that meeting. The Society exists to promote all areas of carotenoid science, pure and applied, and one of its main responsibilities is the organization of future symposia.

The program of the Cairns symposium covered all of the major areas of carotenoid research, including chemistry and analysis, biosynthesis, biotechnology, bioavailability and metabolism, biological functions, photosynthesis, medicine and nutrition, and commercial applications. The symposium featured 11 invited lectures, 68 presentations in special interest sessions, and 71 poster contributions. The total registration was 233.

On behalf of all participants, we would like to thank the Local Organizing Committee, Chair Lance Schlupalius, Roger Hiller, Tom Bruynel, and Ron

Tume, and their helpers, whose dedicated work ensured a memorable symposium.

The participants and the International Carotenoid Society Committee are also most grateful to IUPAC for their sponsorship and support, and for allowing publication of the plenary lectures in *Pure and Applied Chemistry* (see *PAC*, Vol. 71, No. 12, 1999). They also thank the following companies and institutions, without whose support the symposium would not have been possible: F. Hoffman-La Roche, Ltd.; Betatene Pty., Ltd.; LycoRed Natural Products Industries, Ltd.; Wyeth-Ayerst Laboratories, Inc.; Rehnberg Center of Nutrition & Wellness; F. H. Faulding & Co., Ltd.; Nutrilite Division of Amway Corp.; Nikken Sohonsa Co.; Far North Queensland Promotional Bureau; Henkel Corp.; University of Connecticut; Kraft Foods, Inc.; Suntory Co., Ltd.; Thomas J. Lipton Co.; Chr. Hansen A/S.

The symposium editors wish to thank all of the invited speakers who provided manuscripts of high quality, and met the deadlines necessary to publish their work in *PAC*, which we hope will be a useful record of the symposium for those who attended, and for those who could not. As one can see from the papers published in *PAC*, it is becoming increasingly clear that carotenoids are a unique class of molecules that not only pique scientific curiosity, but also perform a variety of fundamentally important biological and nonbiological functions.

Prof. Thomas A. Moore, Ana L. Moore, and Devens Gust
Symposium Editors of the 12th International Symposium on Carotenoids
Cairns, Australia

Reports from Commissions

Commission on Electrochemistry—I.3

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

The Chairman reported on the new project-based structure for IUPAC to be implemented after the General Assembly in 2001 and on IUPAC's strategic goals. Attention was also drawn to interdivisional

initiatives, especially regarding coordination of environmental projects and the strategic initiative on materials chemistry, both of which are highly relevant for electrochemistry and Commission I.3.

The following projects have been completed recently: "Spectroelectrochemistry: A survey of *in situ* spectroscopic techniques", W. Plieth, G. Wilson, and C. Gutierrez, published in *Pure and Applied Chemistry*, 70, 1395–1414, 1998, and "Electrochemical nanotechnology. *In situ* local probe techniques at

electrochemical interfaces”, W. J. Lorenz and W. Plieth, eds., Wiley-VCH, March 1998.

The following Technical Report projects, whose status was discussed during the meeting, are expected to be completed during the next biennium: “Measurements of redox potentials of proteins”, F. Hawkrig and G. Wilson; “Electrochemistry at the interface of two electrolyte solutions”, Z. Samec; “Electrochemistry for the environment”, C. M. A. Brett and J. F. Rusling; and “State of the art of the waste water treatment for industrial plating facilities”, M. de Vogelaere.

New projects to be proposed include “Electrochemistry and interfacial chemistry for environmental cleanup and green chemical processes” (see http://www.iupac.org/divisions/current_projects/2000/990051_100_00.html), together with Commission I.6, which had already attracted cosponsorship from the International Council of Scientific Unions (ICSU), and “Size effects in electrochemical reactivity”.

Joint meetings to discuss common projects and projects of mutual interest were held with Commissions I.1 (Physicochemical Symbols, Terminology, and Units), I.2 (Thermodynamics), I.6 (Colloid and Surface Chemistry including Catalysis), V.5 (Electroanalytical Chemistry), and the Working Party on pH Measurement. There was agreement with Commission I.1, following lengthy discussion and optimization within Commission I.3 over the last three years, concerning the extensively revised electrochemistry section for the forthcoming new edition of the “Green Book” (*Quantities, Units, and Symbols in Physical Chemistry*).

Christopher Brett succeeded Waldfried Plieth as Chairman of the Commission in January 2000, and the new Secretary is Juan Feliu-Martinez.

Christopher Brett
Secretary, IUPAC Commission on
Electrochemistry I.3

Provisional Recommendations

IUPAC Seeks Your Comments

In this section, we publish synopses of IUPAC’s latest provisional recommendations on nomenclature and symbols. All comments on these recommendations are welcome and will be taken into consideration. The final revised versions are published in *Pure and Applied Chemistry*, and synopses of these are published in *Chemistry International* as recent reports.

If you would like to comment on the provisional recommendations, please visit the IUPAC web site (<http://www.iupac.org/>) or write to your nearest national/regional center to request a copy of the full report. Copies are not available from the IUPAC Secretariat. The most recent list of national/regional centers appeared in *Chemistry International* 1997, 17, 141. This information is also available on the IUPAC web site.

Inorganic Chemistry Division. Commission on Nomenclature of Inorganic Chemistry—Names for Muonium Atoms and Ions

Although chemical reactions of muonium atoms have been studied for more than two decades, the

nomenclature of muonium and related species has not been addressed by IUPAC. The name ‘muon’ is used in physics for the species that belong to the lepton family and that are designated with the symbols μ^+ and μ^- , each having a mass 207 times that of the electron. When a negative muon replaces an electron in the 1s orbital of an atom, then this atom is called a ‘muonic’ atom: $H^+\mu^-$ is ‘muonic hydrogen’. Replacement of an electron by a muon in other atoms is possible. Negative muons have been less well studied than positive muons, which are formed as energetic, polarized beams at specialized facilities. The positive muon can abstract an electron near the end of the radiation track, and the combination of positive muon and electron mimics the reactivity of the hydrogen atom. For this combination, the name ‘muonium’ has been used. Were a negative muon to replace an electron in muonium, the name would be ‘muonic muonium’ ($\mu^+\mu^-$).

Comments by 31 December 2000 to Prof. Dr. W. H. Koppenol, Laboratorium für Anorganische Chemie, Eidgenössische Technische Hochschule, Universitätsstrasse 6, CH-8092 Zürich, Switzerland. Tel.: +41 1 632 2875, Fax: +41 1 632 1090, E-mail: koppenol@inorg.chem.ethz.ch.

Awards and Prizes

Alois Fürstner Wins Thieme-IUPAC Prize in Synthetic Organic Chemistry

Prof. Dr. Alois Fürstner, Director of the Max-Planck-Institut für Kohlenforschung, Mülheim, Germany, has won the 5th Thieme-IUPAC Prize in Synthetic Organic Chemistry (2000). The Prize will be presented to him at an Award Lecture on 3 July 2000 at the 13th International Conference on Organic Synthesis (ICOS-13) in Warsaw, Poland.

The Thieme-IUPAC Prize, consisting of DM 10 000, is awarded every two years on the occasion of IUPAC's International Conference on Organic Synthesis (ICOS) to a scientist under 40 years of age, whose research has had a major impact on the field of synthetic organic chemistry. The Prize is sponsored jointly by Georg Thieme Verlag, IUPAC, and the Editors of *Synthesis*, *Synlett*, *Science of Synthesis*, and *Houben-Weyl*.

Prof. Dr. Fürstner was born on 23 July 1962 in Austria. He completed his Ph.D. in carbohydrate chemistry under the direction of H. Weidmann at the Technical University Graz, Austria, in 1987. After working as a postdoctoral fellow with W. Oppolzer on metallo-ene reactions at the University of Geneva, Switzerland (1990–1991), he returned to Graz to obtain his Habilitation on metal activation. In 1993, he joined the Max-Planck-Institut für Kohlenforschung, Mülheim, Germany, as head of a research group. Since 1998, he has held the position of Director at the Institute and is an affiliated professor with the University of Dortmund.

Fürstner's work displays a fruitful interplay of basic research in organometallic chemistry and catalysis, and applications to natural product chemistry and the total synthesis of biologically relevant compounds. Prof. Dr. Fürstner was one of the first chemists to recognize the enormous potential of metathesis for the synthesis of macrocycles. With considerable insight into this reaction, he has spelled out rules on how to implement metathesis-based macrocycle formations in multistep syntheses, and has demonstrated the validity of his concepts by elegant applications to natural product total synthesis. Fürstner's syntheses of the macrolide (–)-gloeosporone, the terpene dactylol, the tripyrrole pigment nonylprodigiosin, and the complex glycolipids tricolorin A and G are highlights in this field.

Fürstner's conceptually new approaches to the synthesis of olfactory macrocycles (e.g., Exaltolide) indicate the enormous potential of olefin metathe-

sis for fine chemical production. Additionally, he has opened up promising new perspectives for preparative chemistry by introducing the first examples of ring-closing alkyne metathesis, as well as a mechanistically unprecedented enyne

metathesis simply catalyzed by platinum(II) chloride. The latter transformation has already been employed in an efficient total synthesis of immunosuppressive alkaloids of the prodigiosin series.

Another major area of Fürstner's work concerns metal-induced C–C bond formations. He has developed a versatile reductive indole synthesis and has pioneered a new branch of catalysis research by discovering McMurry-type reactions catalytic in titanium as well as Nozaki-Hiyama-Kishi reactions catalytic in chromium.

Prof. Dr. Fürstner has achieved worldwide recognition for his highly innovative and creative independent research. He has received several awards, including the prestigious Leibniz Award (1999) from the German Science Foundation.



Milton T. W. Hearn Wins H. G. Smith Memorial Medal

Prof. Milton T. W. Hearn, Chairman and Titular Member of IUPAC's Commission on Biotechnology (III.4) and Titular Member of IUPAC's Organic and Biomolecular Chemistry Division Committee (III.0), has won the coveted H. G. Smith Memorial Medal of the Royal Australian Chemical Institute (RACI) for 1999. Prof. Hearn has served as Professor of Biochemistry, Monash University, Clayton, Victoria, Australia since 1986.

The H. G. Smith Memorial Medal is awarded annually "to the member of RACI who has contributed most to the development of some branch of chemical science". Prof. Hearn was cited for contributing "to the current, advanced state of application of



chemical and biophysical principles and strategies that underpin the chromatographic and electrophoretic sciences in biochemical analysis, including advanced procedures and technologies for the separation of peptides, proteins, and polynucleotides of commercial importance

in the chemical, pharmaceutical, and biotechnological industries". His studies on the structure and function of bioactive peptides, protein hormones, and growth factors involved in normal and disease state processes, including biomolecules involved in the regulation of reproductive function and tumorigenesis, have also attracted much international attention.

Lester A. Mitscher Wins American Chemical Society Division of Medicinal Chemistry Award

Prof. Lester A. Mitscher, Titular Member of IUPAC's Commission on Training and Development (VI.M.2) of the Medicinal Chemistry Section (VI.M), received the 11th ACS Division of Medicinal Chemistry Award at the 27th National Medicinal Chemistry Symposium held 13–17 June 2000 in Kansas City, Missouri, USA. The award was established by ACS in 1979 "to recognize outstanding achievement in

the sciences that contribute to the field of medicinal chemistry".

After a distinguished career at Lederle Laboratories as a group leader in antibiotics, Prof. Mitscher joined the faculty of Ohio State University, where he served as professor of natural products chemistry in the College of Pharmacy. A faculty member at the University of Kansas since 1975, Prof. Mitscher has been chairman of the department of medicinal chemistry for 16 years. Recently retired as editor of *Medicinal Research Reviews*, Prof. Mitscher has had affiliations with the editorial boards of 13 journals, has coauthored or edited 6 books, and has authored almost 250 scientific manuscripts.

Prof. Mitscher's work in natural product chemistry, ranging from development and popularization of circular dichroism for structural elucidation to isolation of novel entities using bioassay-guided fractionation, has gained him great renown. His recent research has focused on identifying and developing new antimicrobial agents, such as those based on tetracycline and quinolone. His isolation of novel antioxidants from green tea has attracted considerable interest among colleagues and in the mass media.

Prof. Mitscher won the Ernest H. Volwiler Award in 1985 and the Smissman Bristol-Myers Squibb Award of the ACS Division of Medicinal Chemistry in 1989. In 1997, he was named Distinguished Alumnus of Wayne State University, from which he received a B.S. degree in pharmacy and a Ph.D. degree in the laboratory of Prof. Carl Djerassi.

New Books and Publications

Macromolecular Symposia, Vol. 147: Mechanical Behavior of Polymeric Materials. Symposium Editor, Jaroslav Kahovec; Editor-in-Chief, Hartwig Hocker; Editors, W. Guth, B. Jung, I. Meisel, and S. Spiegel. Published by WILEY-VCH, December 1999, pp. 1–267. ISBN 3-527-29907-6 (ISSN 1022-1360).

Volume 147 of *Macromolecular Symposia* contains main and special lectures delivered at the 18th Discussion Conference, organized as the 56th meeting in the series of Prague Meetings on Macromolecules (PMM), held in Prague, Czech Republic 20–23 July 1998, as usual under the auspices of IUPAC at the Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic (see symposium report by Prof. Dr. G. H. Michler published in *Chemistry International* in July 1999, Vol. 21, No. 4, pp.

110–111). The topic of the meeting and of this resultant volume, mechanical behavior of polymeric materials, is an area that has an interesting long history and tradition. From the very beginning, this field has been a meeting place of experts from polymer synthesis, processing, and applications. Indeed, mechanical characteristics are decisive for reliable functions of polymers in virtually all application fields—starting from materials for industrial structure parts through medical applications up to contemporary media for data storage. In all these fields, mechanical failure can cause extensive damage and heavy losses. Consequently, mechanical parameters serve for optimization of technological processes, quality control, and right design of dependable parts.

Mechanical behavior of polymeric materials depends on their structure. The structure, in turn, must

be considered at various levels: molecular, supermolecular, crystalline, phase, up to microscopic cracks. Together with the development of mechanical testing methods, a considerable body of knowledge has subsequently been accumulated on interrelations between the parameters of individual levels of hierarchical structure and macroscopic mechanical behavior. This information allowed formulation of structure models on one hand and application of mechanical methods for the characterization of structure and structural dynamics on the other. The understanding of structure–property relationships finally allowed the development of high-performance polymeric materials with dramatically enhanced strength, toughness, durability, and reliability in comparison to classic polymers. Quite logically, the study of mechanical behavior became an important and respected branch of polymer physics.

The meeting that led to Volume 147 of *Macromolecular Symposia* attracted 127 participants from 24 countries. There were 10 main lectures, 10 special lectures, and 74 poster communications. Two panel discussions were devoted to mechanical behavior of high-performance polymers (led by A. Hiltner, United States) and strength and toughness of oriented polymer systems, composites, and blends (led by H. H. Kausch, Switzerland). All the contributions and discussions provided a gauge of the contemporary understanding of structural micromechanisms responsible for macroscopic molecular behavior. In particular, it is clear now that the assessment of complex hierarchical structure is important for the formulation of a realistic structure model of mechanical behavior. As expressed by Prof. Eric Baer, only very few experts in mechanical behavior of polymers did not come to Prague in the summer of 1998. The participants created not only an excellent professional forum, but also very agreeable company. We wish to express our gratitude to all participants and sponsors for supporting the meeting, to the organizing committee for their very good job, and to the contributors for their carefully prepared papers.

Drs.-Ing. Miroslav Raab and Jaroslav Kahovec
Institute of Macromolecular Chemistry
Academy of Sciences of the Czech Republic,
Prague



Lecturers and participants at the 18th Discussion Conference held in Prague, Czech Republic.

Regels voor de Nomenclatuur van de Organische Chemie. Sectie E: Stereochemie en Basisterminologie in de Stereochemie. By H. J. T. Bos, D. Tavernier, F. C. Alderweireldt, and L. Maat. Koninklijke Nederlandse Chemische Vereniging (KNCV), Den Haag, Netherlands (1999), pp. 1–113. ISBN 90-407-1927-6. [Dutch translation of Section E on Stereochemistry from the IUPAC “Blue Book”, *Nomenclature of Organic Chemistry*, prepared for publication by J. Rigaudy and S. P. Klesney, Pergamon Press (1979), pp. xix + 1–559, ISBN 0-08022-3699 and “Basic terminology of stereochemistry” (IUPAC Recommendations 1996), *Pure Appl. Chem.*, Vol. 68, No. 12, pp. 2193–2222, 1996, prepared for publication by G. P. Moss.]

This Dutch translation of Section E on Stereochemistry from the 1979 edition of the IUPAC “Blue Book” (now out of print) and “Basic terminology of stereochemistry” (IUPAC Recommendations 1996) was prepared by H. J. T. Bos, D. Tavernier, F. C. Alderweireldt, and L. Maat of the Koninklijke Nederlandse Chemische Vereniging (KNCV, Royal Netherlands Chemical Society), in cooperation with the Koninklijke Vlaamse Chemische Vereniging (KVCV, Royal Flemish Chemical Society). It is available from the KNCV, Burnierstraat 1, 2596 HV The Hague, Netherlands.

“Basic terminology of stereochemistry” (IUPAC Recommendations 1996) is a glossary of the more important, and most widely used, stereochemical terms. It extends the list of those defined in the IUPAC Nomenclature of Organic Chemistry, Section E: Stereochemistry (IUPAC Recommendations 1974) [*Pure Appl. Chem.*, Vol. 45, No. 1, pp. 11–30, 1976] and includes some terms from the Glossary of Terms used in Physical Organic Chemistry (IUPAC Recom-

mendations 1994) [*Pure Appl. Chem.*, Vol. 66, No. 5, pp. 1077–1184, 1994]. Additional terms have been added from inorganic and macromolecular chemistry. Some misleading terms are included, together with guidance on correct usage or acceptable alternatives. Many of the symbols used in stereochemical nomenclature are mentioned, but details of their assignment or their incorporation into chemical names are left to the appropriate recommendations. Terminology related to techniques used in the determination of stereochemistry is largely excluded, as well as terms used to describe reaction mechanisms.

New Publications from the American Chemical Society and the American Institute of Physics

Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry, Organic Species: Supplement VII. IUPAC Subcommittee on Gas Kinetic Data Evaluation for Atmospheric Chemistry, by R. Atkinson, D. L. Baulch, R. A. Cox, R. F. Hampson Jr., J. A. Kerr (Chairman), M. J. Rossi, and J. Troe. USD 97.00. Published in the *Journal of Physical and Chemical Reference Data*, Vol. 28, No. 2, pp. 191–393, 1999, by the American Chemical Society (1155 Sixteenth Street, N.W., Washington, DC 20036-9976) and the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology [S0047-2689(99)00102-6].

This paper updates and extends part of the previous database of critical evaluations of the kinetics and photochemistry of gas-phase chemical reactions of neutral species involved in atmospheric chemistry [*J. Phys. Chem. Ref. Data* **9**, 295 (1980); **11**, 327 (1982); **13**, 1259 (1984); **18**, 881 (1989); **21**, 1125 (1992); **26**, 521 (1997); **26**, 1329 (1997)].

The present evaluation is limited to the organic family of atmospherically important reactions. The work has been carried out by the authors under the auspices of the IUPAC Subcommittee on Gas Phase Kinetic Data Evaluation for Atmospheric Chemistry. Data sheets have been prepared for 171 thermal and photochemical reactions, containing summaries of the available experimental data with notes giving details of the experimental procedures.

For each thermal reaction, a preferred value of the rate coefficient at 298 °K is given, together with a temperature dependence where possible. The selection of the preferred value is discussed, and esti-

mates of the accuracies of the rate coefficients and temperature coefficients have been made for each reaction.

For each photochemical reaction, the data sheets list the preferred values of the photoabsorption cross-sections and the quantum yields of the photochemical reactions, together with comments on how they were selected.

The data sheets are intended to provide the basic physical chemical data needed as input for calculations that model atmospheric chemistry. A table summarizing the preferred rate data is provided, together with an Appendix listing the available values of enthalpies of formation of the reactant and product species.

IUPAC-NIST Solubility Data Series 67. Halogenated Ethanes and Ethenes with Water, by Ari L. Horvath, Forrest W. Getzen, and Z. Maczynska. USD 109.00. Published in the *Journal of Physical and Chemical Reference Data*, Vol. 28, No. 2, pp. 395–627, 1999, by the American Chemical Society (1155 Sixteenth Street, N.W., Washington, DC 20036-9976) and the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology [S0047-2689(99)00202-0].



This volume covers the solubilities of halogenated ethanes and ethenes with water, heavy water, seawater, and aqueous electrolyte solutions. All data were critically examined for their reliability, and best value estimates were selected on the basis of such evaluations. Referenced works are presented in the standard IUPAC-NIST

Solubility Data Series format. Reported and best value data are presented in tabular form and, where justified, data correlation equations and graphical illustrations are provided. Throughout the volume, SI conventions have been employed as the customary units.

The importance of these data arises from the fact that halogenated ethanes and ethenes have commercial uses as industrial chemicals, propellants, solvents, and the like. In such applications, often from

spillage, leakage, or mishandling, they contact water and are exposed to the atmosphere. The data are essential for concentration estimates for the halogenated ethanes and ethenes in drinking and ground water, foodstuffs, human tissue, marine organisms, and the atmosphere.

The halogenated aliphatics are of particular interest to health scientists, engineers, environmentalists, and atmospheric chemists in that they represent a class of chemical materials that has many significant industrial applications. However, at the same time, these substances have been shown, in some cases, to be carcinogenic and also to be especially damaging to the earth's atmospheric composition through their chemical reactivity, which results in atmospheric ozone depletion. The high ozone depletion potentials of this class of chemical substances emphasizes the importance of having available complete, accurate, and reliable data for mutual solubilities with water. The availability of such data is essential for estimates of halogenated hydrocarbon levels in both natural waters and aqueous industrial liquids that result from industrial fabrication, industrial waste removal processes, and the like. The data also provide significant solubility values for studies concerning the health of human and other biological systems.

***IUPAC-NIST Solubility Data Series 68. Aliphatic Compounds C_3 – C_{14} with Water*, by Ari L. Horvath and Forrest W. Getzen. USD 67.00. Published in the *Journal of Physical and Chemical Reference Data*, Vol. 28, No. 3, pp. 649–777, 1999, by the American Chemical Society (1155 Sixteenth Street, N.W., Washington, DC 20036-9976) and the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology [S0047-2689(99)00403-1].**

This volume covers the solubilities of halogenated aliphatic C_3 – C_{14} compounds with water, heavy water, seawater, and aqueous electrolyte solutions. All data were critically examined for their reliability, and best value estimates were selected on the basis of such evaluations. Referenced works are presented in the standard IUPAC-NIST Solubility Data Series format. Reported and best value data are presented in tabular form and, where justified, data correlation equations and graphical illustrations are provided. Throughout the volume, SI conventions have been employed as the customary units.

The importance of these data arises from the fact that halogenated aliphatics have commercial uses in a variety of applications such as industrial chemicals, process raw materials, solvents, and the like.

In such applications, they are often in contact with water and are routinely exposed to the atmosphere. Sometimes, such contact and exposure results from spillage, leakage, or mishandling. Reliable data are essential for concentration estimates for the halogenated aliphatics in drinking and ground water, foodstuffs, human tissue, marine organisms, and the atmosphere.

The halogenated aliphatics are of particular interest to health scientists, engineers, environmentalists, and atmospheric chemists in that they represent a class of chemical materials that has many significant industrial applications. However, at the same time, some of this class of substances have been shown to be carcinogenic and also to be especially harmful for the earth's atmospheric and natural water composition. Indeed, the chemical reactivity of some halogenated aliphatics has resulted in atmospheric ozone depletion. The high ozone depletion potentials of such chemical substances emphasizes the importance of having available complete, accurate, and reliable data for mutual solubilities with water. The availability of such data is essential for estimates of halogenated aliphatic hydrocarbon levels in both natural water and aqueous industrial liquids that result from industrial fabrication, industrial waste removal processes, and the like. The data also provide significant solubility values for studies concerning the health of human and other biological systems.

***IUPAC-NIST Solubility Data Series 69. Ternary Alcohol–Hydrocarbon–Water Systems*, by Adam Skrzecz, David Shaw, and Andrzej Maczynski. USD 117.00. Published in the *Journal of Physical and Chemical Reference Data*, Vol. 28, No. 4, pp. 983–1236, 1999, by the American Chemical Society (1155 Sixteenth Street, N.W., Washington, DC 20036-9976) and the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology [S0047-2689(99)00304-9].**

The mutual solubilities of ternary systems containing alcohols, hydrocarbons, and water are reviewed. An exhaustive search of the literature was attempted for numerical data on all alcohols and hydrocarbons that are liquid at STP. Data were found for alcohols with up to nine carbon atoms, but mostly with fewer than four carbons. Data for a variety of hydrocarbon structural types were found, including alkane, alkene, and arene. A total of 205 original studies treating 116 ternary systems that have been published through 1992 are compiled. For 47 systems, sufficient data were available to allow critical evalua-

tion. All solubility data are expressed as mass and mole fractions as well as the originally reported units. Similar reviews of the related binary systems have previously been prepared for the Solubility Data Series.

New Publications from the National Institute of Standards and Technology

***Guide to the Nomenclature of Particle Dispersion Technology for Ceramic Systems*, by Vincent A. Hackley. NIST Special Publication 945, U.S. Department of Commerce, Technology Administration, National Institute of Standards and Technology, 24 pp., 2000. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325.**

This little pamphlet is the work of a committee of academic, government, and industry specialists and is designed to provide a collection of standard definitions for the most common technical terms used in the area of particle dispersion technology for ceramic systems. The aim is certainly a worthy one, because the fields of particle technology and colloid science cover a diverse range of applications and have given rise to an equally diverse nomenclature.



The nomenclature problem stems partly from the wide range of areas to which the subject has some relevance—from food science through pharmaceuticals and cosmetics all the way to agricultural and soil engineering. But there is also the fact that many of these areas have a very long history of prescientific technological development, and in none of them is that more evident than in ceramics. The modern scientific understanding of ceramic processing has been grafted onto the enormously rich

legacy of art and craft that underpinned the technology until relatively recently, and which still strongly influences some areas even today.

Because I had an opportunity to look at the material and offer comments prior to publication, I have not found any obvious deficiencies in the final work. There are some odd statements, however, such as the separation of the term *fine* from *coarse*, which is said to correspond to a dimension less or more than *roughly* 37 μm (my emphasis). It seems curious to make the separation so precisely and call it *roughly* until one translates that dimension into a sieve size and then recognizes it in terms of an aperture for a standard screen measured in the old f.p.s. unit of inches. Such are the strange ways in which we are reminded of the history of the subject.

There are well over a hundred definitions, covering the description of disperse systems, states of subdivision, association and dissociation processes, dispersion stability, and interfacial and electrokinetic properties. Each is succinct and carefully presented together with a bibliography and index.

I would not pretend that everyone will agree that every definition is couched in the most effective way. There will even be arguments about the exact meaning of some terms. When the phenomenon of particle association is described by terms like aggregation, agglomeration, coagulation, and flocculation (and there may be more), there is ample room for disagreement on details, but the definitions offered here have the weight of common usage behind them. The purpose of the exercise is to encourage a wider and more consistent use of the terms. That can only be an aid to communication and a contribution to clarity. The distinguished group of advisors on this project and the recorder, Vince Hackley, are to be congratulated on so ably performing such an important service.

Robert J. Hunter
School of Chemistry
University of Sydney

New Book from The Royal Society of Chemistry

***Chemistry, Society, and Environment: A New History of the British Chemical Industry*. Editor: Colin Russell (History of Chemistry Research Group, Open University, Milton Keynes MK6 7AA, England, UK).**

Public attitudes toward science have turned from awe to mistrust, and nowhere is this transformation more apparent than in the public image of the chemical

industry. The industry is seen as the great polluter, with much of the blame for the current environmental crisis laid firmly at its door. At the other extreme, many attempts by supporters to explain the benefits of the chemical industry have focused exclusively on the positive and have lacked any analysis of its effects on either society or the environment.

This book, published by the Royal Society of Chemistry, presents a critical history of the British chemical industry, with a focus on its social and environmental impact, both historically and in the present. Above all, it aims to be objective, and strong criticism is voiced on some issues. However, unexpected findings also emerge. For example, the book shows that industrial chemists have always been aware of the environmental consequences of their activities, and they have often found satisfactory ways of dealing with them. Overall, the chemical industry emerges in a more positive light than its

popular image suggests.

No assessment of the environmental dilemmas we now face can be complete without an understanding of how they developed. From academics to industrialists to politicians, all those concerned with the social and environmental impact of the chemical industry will find their understanding broadened by this book. The editor, Colin Russell, and the three contributing authors are honorary members of the History of Chemistry Research Group of the Open University.

For further details or to order this book, contact Sales and Customer Care, The Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, England CB4 0WF, UK; E-mail: sales@rsc.org; Tel.: +44 1223 432360; Fax: +44 1223 423429; Web site: <http://www.rsc.org/metpath> or <http://www.chemsoc.org/>.

Conference Announcements



designates IUPAC sponsorship.

114th AOAC International Annual Meeting and Exposition, 10–14 September 2000, Philadelphia, Pennsylvania, USA

This meeting focuses on analytical methodology and laboratory management for chemists, microbiologists, and other scientists working in analysis of foods, beverages, feeds, fertilizers, pesticides, soil, water, human and animal drugs, hazardous wastes, forensics, and other related areas.

Scheduled program topics include advances in herbal and dietary supplement analysis, AOAC Technical Division for Laboratory Management, capillary electrophoresis, drugs [harmonization of CEN (European) and AOAC methods], European Union community recovery, genetically modified organisms (GMOs), liquid chromatography/mass spectrometry (LC/MS), *Listeria* methods, microbiological accreditation regulations (microbiology, food, chemistry, drugs, agriculture), PCB/natural toxin contamination (air/food/water), phasing in Good Manufacturing Practices (GLPs) to analytical testing laboratories, proficiency testing (accreditation/quality assurance), regulatory chromatography standards and methods (advantages and disadvantages), and the Wiley Award Symposium on Authentication of Fats and Oils.

The meeting will also feature numerous poster sessions to give attendees the chance to talk with

presenters one-on-one. A large Expo will display the latest in analytical laboratory equipment and services, and will provide the opportunity to discuss needs with vendors and learn how to improve your laboratory.

Training courses held before and after the meeting will include sessions on intralaboratory (in-house) analytical method validation; ISO9000, ISO/IEC Guide 25, and the laboratory; quality assurance for analytical laboratories; quality assurance for microbiological laboratories; and statistics for method development.

Holding this first AOAC International Annual Meeting of the new millennium in Philadelphia, which was the site of the very first Annual Meeting of the Association of Official Analytical Chemists back in 1886, provides an opportunity to reflect on AOAC's long history and to envision the



Association's place in the future.

For more information, contact the AOAC International Meetings and Education Department, 481 North Frederick Avenue, Suite 500, Gaithersburg, Maryland 20877-2417, USA; E-mail: meetings@aoac.org; Tel: +1-800-379-2622 from North America or +1 301 924 7077 worldwide; Fax: +1 301 924 7089; Web site: <http://www.aoac.org>. The web site will have regularly updated information about the meeting.

16th IMEKO World Congress, 25–28 September 2000, Vienna, Austria

This Congress of the International Measurement Confederation, IMEKO 2000, is being organized by the Austrian Society for Measurement and Automation (ÖGMA). The scope of this meeting is extremely broad, encompassing the following areas:

- education and training in measurement and instrumentation
- photonic measurements
- measurement of force, mass, and torque
- measurement of electrical quantities
- hardness measurement
- measurement science
- traceability in metrology
- flow measurement
- technical diagnostics
- metrological infrastructures
- thermal and temperature measurement
- measurements in biology and medicine
- measurement of geometrical quantities
- experimental mechanics
- pressure and vacuum measurement
- measurement in robotics
- measurement of human functions
- special topics for IMEKO-XVI in Vienna
- micro and nano technology
- estimation of uncertainty and errors in measurement
- interfaces of measurement and decision making
- expert systems in decision making
- statistical evaluation of measurement results
- quality management
- environmental management
- sustainable development and its indicators

For additional information, contact the Congress Secretariat, Abteilung Austauschbau und Messtechnik (AuM), Karlsplatz 13/3113, A-1040 Wien, Austria; E-mail: imeko@mail.ift.tuwien.ac.at or imeko2000@ove.e2i.at; Tel: +43 1 58801 31140 or +43 1 585 52 71; Fax: +43 1 58801 31196 or +43 1 585 85 91; Web site: <http://www.imeko2000.at>.

POLYCHAR-9 World Forum on Polymer Applications and Theory and Short Course on Polymer Characterization, 8–12 January 2001, Denton, Texas, USA



The POLYCHAR-9 Conference (9–12 January) focus is on characterization on one hand and synthesis, processing, manufacturing, and properties on the other, with emphasis on predictions of service performance. All polymer-based materials, including thermoplastics, thermosets, heterogeneous and molecular composites, blends, polymer melts, and solutions, are covered.

Research presentations will be in oral and poster formats in the following areas:

- predictive methods
- polymerization
- polymer liquid crystals
- mechanical properties and performance
- dielectric and electrical properties
- interfaces
- rheology
- solutions and processing
- recycling
- characterization
- structure–property relations

Prizes to young investigators and students will be awarded for a presentation in either format; the Paul J. Flory Prize for Polymer Research might also be awarded. There will be an equipment and book exhibition. Participants from 41 countries took part in POLYCHAR-8 in January 2000.

The Short Course (8 January) will include the following topics:

- computerized mechanical testing (tension, compression, bending, impact, stress relaxation, friction, and dynamic mechanical analysis)
- thermophysical characterization (differential scanning calorimetry, thermogravimetric analysis, thermal mechanical analysis, and PVT measurements for solids and melts)
- electrical properties (dielectric spectroscopy and thermally stimulated depolarization)
- microscopy
- interface investigation

These Conferences used to be called International Conferences on Polymer Characterization; the new name better reflects the wide profile and the fact that experimentalists, modeling and simulation people, and theorists jointly discuss their research and de-

velopment results.

The following speakers have been invited to discuss their research and/or provide overviews:

- Akihiro Abe, Technical University of Tokyo, Japan
- James Economy, University of Illinois, Urbana-Champaign, USA
- Robert G. Gilbert, University of Sydney, Australia
- Ailton de Sousa Gomes, Federal University of Rio de Janeiro, Brazil
- Lutz Goetlich, North Atlantic Treaty Organization, Brussels, Belgium
- Yuri S. Lipatov, Institute of Macromolecular Chemistry, Kiev, Ukraine
- Andrew J. Lovinger, National Science Foundation, Arlington, Virginia, United States
- Georg H. Michler, Martin-Luther University, Merseburg, Germany
- Jaan Noolandi, Xerox Research Centre of Canada, Mississauga, Ontario, Canada
- Deodato Radic, Pontifical University of Chile, Santiago, Chile
- Michael Silverstein, Technion, Haifa, Israel
- George Springer, Stanford University, California, United States

For further information, contact POLYCHAR-9, University of North Texas, P.O. Box 305310, Denton, TX 76203-5310, USA; E-mail: polychar@marta.phys.unt.edu; Fax: +1 940 565 4824; Web site: <http://www.unt.edu/POLYCHAR/>.

6th International Conference on Heteroatom Chemistry (ICHAC-6), 22–27 June 2001, Łódź, Poland

The scientific program of this conference will cover all aspects of heteroatom chemistry, in particular: basic heteroatom chemistry, heteroatom chemistry toward organic synthesis, biologically relevant heteroatom compounds, supramolecular and coordination chemistry of heteroatoms, and advanced heteroatom-containing materials. Each field will be represented by plenary and invited lectures. Prof. Marian Mikolajczyk will serve as Conference Chairman; Profs. Binne Zwanenburg and Grzegorz Mlostń will be Cochairmen.

For more information, contact Dr. Piotr Kielbasinski, Conference Secretary of ICHAC-6, Center of Molecular and Macromolecular Studies, Polish Academy of Sciences, Sienkiewicza 112, 90-363 Łódź, Poland; E-mail: piokiel@bilbo.cbmm.lodz.pl; Tel.: +48 42 681 58 32; Fax: +48 42 684 71 26.

38th IUPAC Congress—Frontiers in Chemistry/World Chemistry Congress 2001, 1–6 July 2001, Brisbane, Australia



Held in conjunction with the 41st IUPAC General Assembly (29 June–8 July 2001) and incorporating the 9th Asian Chemistry Congress (1–4 July 2001) and AIMECS 01 (3–6 July 2001), the 38th IUPAC Congress/World Chemistry Congress 2001 in Brisbane, Australia will be a landmark event, featuring a diverse program and a range of associated meetings and activities that will combine to make attendance a valuable experience. The Royal Australian Chemical Institute will host all the Congress events in Brisbane, a city that offers every amenity and is an ideal point from which to explore the vast Australian continent.



Scientific program themes will include the following:

Materials Chemistry for the Future

- materials chemistry in confined systems
- supramolecular chemistry
- biomaterials
- spectroscopy, optoelectronics, energy production, and storage
- combinatorial methods for novel materials and devices
- novel polymeric and composite materials

Chemistry by Computer

- molecular structure and reactions: theories, modeling, and experimentation
- chemical education in the information age
- chemometrics
- trends in computational quantum chemistry and chemical dynamics
- molecular simulations and theory of complex materials

Challenges for Drug Discovery and Development in the 21st Century—Joint with AIMECS 01

- target discovery
- libraries and screens
- molecular design
- molecular development
- new vistas in therapy

Environmental Chemistry and the Greening of Industry

- chemical synthesis, processing, and analysis for improved environmental impact
- chemistry of responsible care
- atmospheric, urban air, and water chemistry
- chemistry of energy production and use
- agricultural chemistry
- standards and measurement of future directions

Modern Synthetic Chemistry

- new synthetic transformations
- combinatorial diversity in synthesis
- new organometallics—synthesis and applications
- inorganic and organic catalysis in synthetic and biological systems
- novel macromolecule syntheses
- synthetic efficiency for health and profit

The preliminary program will be released this month. Early bird discount registration closes 3 December 2000. Abstract submissions are invited for contributed oral and poster presentations on topics within the scope of the World Chemistry Congress and the associated meetings. Abstract submissions close on 31 March 2001, and authors will be notified after 1 May 2001.

A trade exhibition will be a major feature of the World Chemistry Congress, and organizations interested in commercial display opportunities are welcome. A detailed exhibition kit is available to those who contact the Congress Secretariat.

For more information, contact World Chemistry Congress 2001 Secretariat, P.O. Box 177, Red Hill Q 4059, Australia; E-mail: wcc2001@ccm.com.au; Tel.: +61 7 3368 2644; Fax: +61 7 3369 3731; Web site: <http://www.ccm.com.au/wcc> or contact Executive Secretariat, Associate Professor Mary Garson, Chemistry Department, The University of Queensland; E-mail: wcc2001@chemistry.uq.edu.au.

10th International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin, and Lead, 8–12 July 2001, Talence, France



This conference, held once every three years, provides an international forum for presentation and discussion of new findings in molecular and supramolecular chemistry of germanium, tin, and lead. Compounds of these metals have long been at a center stage of chemistry, with far-reaching impact on products, processes, and technologies that continue to underpin chemical industries and quality of life. In many fields, they continue to show their mettle, and important results emerge continually. Recently, germanium, tin, and lead compounds have shown promising new applications in organic synthesis, materials chemistry, surface chemistry, catalysis, analytical chemistry, and as multiply bonded intermediates. Around 250 scientific participants from around the world are expected to attend this conference.

For additional information, contact Dr. B. Jousseume, Laboratoire de Chimie Organique et Organométallique, UMR 5802, Université Bordeaux I, 351 avenue de la Libération, F-33405 Talence Cedex, France; E-mail: b.jousseume@lcoo.u-bordeaux.fr; Tel.: +33 (0) 5 56 84 64 43; Fax: +33 (0) 5 59 84 69 94.

11th IUPAC International Symposium on Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS 11), 22–26 July 2001, Tapei, Taiwan



This symposium continues a long and distinguished series of IUPAC-sponsored symposia in an important interdisciplinary area of growing significance. OMCOS 11 will feature sessions on asymmetric synthesis via organometallics, structural and mechanistic aspects related to synthesis, metal-organics in materials, catalytic processes involving organometallics, new C–C and C–heteroatom bond-forming processes via metals, and cyclizations/ring-opening reactions involving organometallics. Approximately 800 scientific participants are expected to attend OMCOS 11.

For further information, contact Prof. Tien-Yau Luh, Department of Chemistry, National Taiwan University, Tapei 106, Taiwan; E-mail: tyluh@ccms.ntu.edu.tw; Tel.: +886 2 23636288; Fax: +886 2 23644971; Web site: <http://www.ch.ntu.edu.tw/omcos/>.

6th International Symposium on
Bioorganic Chemistry (ISBOC-6),
12–15 May 2002, Toronto, Canada



This symposium continues a tradition of IUPAC-sponsored symposia on bioorganic chemistry; the most recent ones were held this past January in Pune, India (ISBOC-5) and in 1997 in Biarritz, France (ISBOC-4). These symposia focus on advancement of international collaboration and communication at the interface of organic chemistry with biological and medicinal science. ISBOC-6 will feature sessions on bioorganic mechanisms: key problems for the 21st century, bioorganic chemistry and discovery of new therapeutics, and biomimetic processes and synthesis—impact of automation. Approximately 1 000 scientific participants are expected to attend ISBOC-6.

For more information, contact Prof. Ronald Kluger, Department of Chemistry, University of Toronto,

Toronto, Canada M5S 3H6; E-mail: rkluger@chem.utoronto.ca; Tel. and Fax: +1 416 978 3582.

10th International Conference on
Polymer Characterization
(POLYCHAR-10), 7–11 January 2002,
Denton, Texas, USA



This continuing series of conferences has been held annually at the University of North Texas since 1992. For a description of the goals and content of the conference, see the listing for POLYCHAR-9 (9–12 January 2001) above.

For additional information, contact POLYCHAR-10, University of North Texas, P.O. Box 305310, Denton, TX 76203-5310, USA; E-mail: polychar@marta.phys.unt.edu; Fax: +1 940 565 4824; Web site: <http://www.unt.edu/POLYCHAR/>.

Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

NEW designates a new conference since the last issue.

2000

Organic Synthesis

1–5 July 2000
13th International Conference on Organic Synthesis (ICOS-13), Warsaw, Poland.
Prof. M. Makosza, Institute of Organic Chemistry, Kasprzaka 44, 01-224 Warsaw 42, P.O. Box 58, Poland.
Tel.: +48 22 631 8788
Fax: +48 22 632 6681
E-mail: icho-s@ichf.edu.pl

Physical Organic Chemistry

8–13 July 2000
15th International Conference on Physical Organic Chemistry (ICPOC 15), Göteborg, Sweden.
Prof. P. Ahlberg, Organic Chemistry, Department of Chemistry, Göteborg University, SE-412 96, Göteborg, Sweden.
Tel.: +46 31 7722900
Fax: +46 31 7723843
E-mail: Per.Ahlberg@oc.chalmers.se

Macromolecules

9–14 July 2000
38th International Symposium on Macromolecules (MACRO 2000), Warsaw/Łódź, Poland.
Prof. Stanislaw Penczek, Polish Academy of Sciences, ul. Sienkiewicza 112, 90363 Łódź, Poland.
Tel.: +48 42 81 9815
Fax: +48 42 684 7126
E-mail: spenczek@bilbo.cbmm.lodz.pl

Coordination Chemistry

9–14 July 2000
34th International Conference on Coordination Chemistry (34-ICCC), Edinburgh, Scotland.
Prof. P. Tasker, Chairman
Dr. John F. Gibson, Secretary
The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.
Tel.: +44 171 440 3321
Fax: +44 171 734 1227
E-mail: gibsonj@rsc.org

Polymers in Medicine

17–20 July 2000
40th Microsymposium on Polymers in Medicine, Prague, Czech Republic.
Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Science of the Czech Republic, Heyrovského nam. 2, 162 06 Praha 6, Czech Republic.
Tel.: +420 2360341
Fax: +420 2367981
E-mail: sympo@imc.cas.cz

Polymer Networks '2000

17–21 July 2000
15th Polymer Networks Group Meeting "Polymer Networks '2000", Cracow, Poland.
Prof. H. Galina, Rzeszow University of Technology, Faculty of Chemistry, W. Pola Str.2, PL 35-959 Rzeszow, Poland.
Tel.: +48 17 628 057
Fax: +48 17 854 3655
E-mail: hgal@prz.rzeszow

Photochemistry

22–27 July 2000

18th IUPAC Symposium on Photochemistry, "Photochemistry into the New Century", Dresden, Germany.

Prof. Dr. Silvia E. Braslavsky, Max-Planck Institut für Strahlenchemie, Postfach 101365, D-45413 Mülheim an der Ruhr, Germany.
Tel.: +49 (208) 306 3681
Fax: +49 (208) 306 3951
E-mail: braslavskys@mpi-muelheim.mpg.de

Organometallic Chemistry

23–28 July 2000

19th International Conference on Organometallic Chemistry (XIX ICOMC), Shanghai, China.

Profs. Li Xin Dai and Chang Tao Qian, Chairmen, Prof. Xue Long Hou, Secretary, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, 354 Fenglin Road, Shanghai 200032, PR, China,
Tel.: +86 21 641 63300
Fax: +86 21 641 66128
E-mail: xlhou@pub.sioc.ac.cn

Solubility Phenomena

25–28 July 2000

9th International Symposium on Solubility Phenomena (9th ISSP), Hammamet, Tunisia.

Prof. Najia Kbir-Ariguib, National Institute for Scientific and Technical Research, P.O. Box 95, Hammam-Lif, 2050 Tunisia.
Tel: +216 1 430 215
Fax: +216 1 430 934
E-mail: ariguib@planet.tn

Chemical Education

5–10 August 2000

16th International Conference on Chemical Education: Chemistry for a Healthier Planet (16 ICCE), Budapest, Hungary.

Prof. Alajos Kalman, Chairman, Prof. Gabor Naray-Szabo, Department of Theoretical Chemistry, Lorand Eotvos

University, Pazmany Peter st. 1b, H-1117 Budapest, Hungary.
Tel.: +36 1 209 0555, ext. 16-30
Fax: +36 1 209 0602
E-mail: mail2.mke@mtesz.hu

Chemical Thermodynamics

6–11 August 2000

16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, Canada.

Prof. M. A. White, Department of Chemistry, Dalhousie University, Halifax, Nova Scotia B3H 4J3, Canada.
Tel.: +1 902 494 3894
Fax: +1 902 494 1310
E-mail: MaryAnne.White@DAL.CA

Thermal Analysis and Calorimetry

14–18 August 2000

12th International Congress on Thermal Analysis and Calorimetry, Copenhagen, Denmark.

Dr. O. Toft Sorensen, Materials Research Department, Riso National Laboratory DK-4000, Roskilde, Denmark.
Tel: +45 4677 5800
Fax: +45 4677 5758
E-mail: o.toft.sorensen@risoe.dk

Biotechnology

3–8 September 2000

11th International Biotechnology Symposium, Berlin, Germany.

Prof. G. Kreysa, DECHEMA e.V.— c/o 11th IBS, Theodor-Heuss-Allee 25, 60486 Frankfurt/Main, Germany.
Tel.: +49 69 7564 235 / -249
Fax: +49 69 7564 176 / -304
E-mail: biotechnology2000@dechema.de

Nuclear and Radiochemistry

3–8 September 2000

5th International Conference on Nuclear and Radiochemistry (NRC5), Pontresina, Switzerland.

Prof. H. W. Gäggeler, Chairman,

Mrs. R. Lorenzen, Secretary, Paul Scherrer Institut, CH-5232 Villigen-Ost, Switzerland.
Tel.: +41 56 310 2401
Fax: +41 56 310 4435
E-mail: ruth.lorenzen@psi.ch

Analytical Chemistry

3–9 September 2000

EUROANALYSIS XI, Lisboa, Portugal.

Prof. Maria Filomena Camões, Chair, Dr. Cristina Oliveira, Secretary, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade de Lisboa, Edifício C1-5º Piso, P-1700 Lisboa, Portugal.
Tel.: +351 1 3906138
Fax: +351 1 3909352; 7500088
E-mail: euroanalysisxi@fc.ul.pt

Natural Products

4–8 September 2000

22nd International Symposium on the Chemistry of Natural Products, São Carlos, São Paulo, Brazil.

Dr. M. Fátima das G.F. da Silva, Universidade Federal de São Carlos, Depto. de Química, Via Washington Luiz, km 235, CP676, São Carlos, São Paulo, Brazil.
Tel.: +55 16 260 8208
Fax: +55 16 260 8350
E-mail: dmfs@power.ufscar.br

Medicinal Chemistry

18–22 September 2000

XVI International Symposium on Medicinal Chemistry, Bologna, Italy.

Prof. C. Melchiorre, Università di Bologna, Dipartimento di Scienze Farmaceutiche, Via Belmeloro 6, I-40126 Bologna, Italy.
Tel.: +39 051 259 706
Fax: +39 051 259 734
E-mail: camelch@alma.unibo.it

Trace Elements in Food

9–11 October 2000

Warsaw, Poland.

*Prof. B. Szteke, Chairman, Dr. R. Jedrzejczak, Secretary, Institute of Agricultural and Food Biotechnology
ul. Rakowiecka 36
02-532 Warsaw, Poland.
Tel.: +48 22 606 3876
Fax: +48 22 4904 28
E-mail:
jedrzejczak@ibprs.waw.pl*

Food Packaging

8–10 November 2000

2nd International Symposium on Food Packaging—Ensuring the Safety and Quality Food, Vienna, Austria.

*Liên-Anh Tran, ILSI Europe, 83, Avenue E. Mounier, Box 6, B-1200, Brussels, Belgium.
Tel.: +32 (2) 771 0014
Fax: +32 (2) 762 0044
E-mail: anh@ilsieurope.be*

Polymers

20–24 November 2000

7th Latin-American Symposium on Polymers (SLAP'2000) and 5th Ibero American Congress on Polymers, Havana, Cuba.

*Dr. Ricardo Martínez, Dr. Waldo Argüelles-Monal, IMRE, Universidad de La Habana La Habana 10400, Cuba.
Fax: +53 7 33 42 47
E-mail: slap@imre.oc.uh.cu*

2001

Polymer Characterization

9–12 January 2001

9th International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.

*Dr. Witold Brostow, Department of Materials Science, University of North Texas, Denton, Texas, 76203-5310 USA.
Tel.: +1 940 565 4358, -3262, or 4337
Fax: +1 940 565 4824*

E-mail: brostow@unt.edu or polychar@marta.phys.unt.edu

Chemistry and Chemical Engineering

16–20 April 2001

IV International Congress on Chemistry and XIII Caribbean Conference on Chemistry and Chemical Engineering, Havana, Cuba.

Prof. Alberto J. Núñez Sellés, Sociedad Cubana de Química, Ave 21&200, Atabey, Apdo. 16042, CP 11600, Havana, Cuba.

Tel.: +537 218 178

Fax: +537 336 471

E-mail: cqf@infomed.sld.cu

CHEMRAWN XIV

9–13 June 2001

Chemrawn Conference—Toward Environmentally Benign Processes and Products, Boulder, Colorado, USA.

Dr. Dennis L. Hjerresen, Environmental Management Program, Los Alamos National Laboratory - Mail Stop J591, Los Alamos, NM 87545.

Tel.: +1 505 665 7251

Fax: +1 505 665 8118

E-mail: dennish@lanl.gov

IUPAC 41st General Assembly

29 June–8 July 2001

Brisbane, Australia.

IUPAC Secretariat.

Tel.: +1 919 485 8700

Fax: +1 919 485 8706

E-mail: secretariat@iupac.org

IUPAC 38th Congress/World Chemistry Congress 2001

1–6 July 2001

Brisbane, Australia.

Congress Secretariat, P.O. Box 177, Red Hill Q 4054, Australia.

Tel.: +61 7 3368 2644

Fax: +61 7 3369 3731

E-mail: wcc2001@ccm.com.au

How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsorship, conference organizers should complete an Advance Information Questionnaire (AIQ). The AIQ form is available at <http://www.iupac.org> or by request at the IUPAC Secretariat, and should be returned between 2 years and 12 months before the conference. Further information on granting sponsorship is included in the AIQ and available online.

Coordination and Organometallic Chemistry of Germanium, Tin, and Lead

8–12 July 2001

10th International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin, and Lead, Talence, France.

Dr. B. Jousseume, Laboratoire de Chimie Organique et Organometallique, UMR 5802, Université Bordeaux 1, 351 avenue de la Libération, F-33405 Talence Cedex, France.

Tel.: +33 (0) 5 56 84 64 43

Fax: +33 (0) 5 59 84 69 94

E-mail: b.jousseume@lcoo.u-bordeaux.fr

Scattering Methods and Polymers

9–12 July 2001

20th Discussion Conference on Scattering Methods for the Investigation of Polymers, Prague, Czech Republic.

Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nam. 2, CZ-162 06 Praha 6, Czech Republic.

Tel.: +420 2 204 0332

Fax: +420 2 367 981

E-mail: sympo@imc.cas.cz

Polymer Membranes

16–19 July 2001
41st Microsymposium on
Polymer Membranes,
Prague, Czech Republic.

*Dr. Jaromir Lukas, Institute of
Macromolecular Chemistry,
Academy of Sciences of the
Czech Republic, Heyrovského
nam. 2, CZ-162 06 Praha 6,
Czech Republic.*

Tel.: +420 2 204 03332

Fax: +420 2 367 981

E-mail: sympo@imc.cas.cz

Organometallic Chemistry

22–26 July 2001

11th IUPAC International
Symposium on Organometallic
Chemistry Directed

Towards Organic Synthesis
(OMCOS 11), Tapei, Taiwan.

*Prof. Tien-Yau Luh, Department
of Chemistry, National Taiwan
University,*

Tapei 106, Taiwan.

Tel.: +886 2 23636288

Fax.: +886 2 23644971

E-mail: tyluh@ccms.ntu.edu.tw

Phosphorus Chemistry

29 July–3 August 2001

15th International Conference on
Phosphorus Chemistry, Sendai,
Japan.

*Prof. Masaaki Yoshifuji, Depart-
ment of Chemistry, Graduate
School of Science, Tohoku
University, Aoba, Sendai 980-
8578, Japan.*

Tel.: +81 22 217 6558

Fax: +81 22 217 6562

E-mail:

yoshiffj@mail.cc.tohoku.ac.jp

Analytical Sciences

6–10 August 2001

International Congress on
Analytical Sciences 2001
(ICAS2001), Tokyo, Japan.

*Prof. Tsuguo Sawada, Chair-
man, Department of Applied
Chemistry, The University of
Tokyo, 7-3-1 Hongo, Bunkyo-ku,
Tokyo 113-8656, Japan.*

Tel.: +81 3 5841 7236 (or 7237)

Fax: +81 3 5841 6037

*E-mail: icas2001@laser.t.u-
tokyo.ac.jp*

Biodiversity

3–8 November 2001

3rd IUPAC International Confer-
ence on Biodiversity (ICOB-3),
Antalya, Turkey.

*Prof. B. Sener, Department of
Pharmacognosy, Faculty of
Pharmacy, Gazi University, P.O.
Box 143 06572, Maltepe-
Ankara, Turkey.*

Tel.: +90 312 212 2267

Fax: +90 312 213 3921

E-mail: blgsener@tr-net.net.tr

Sweeteners

13–17 November 2001

2nd International Symposium on
Sweeteners, Hiroshima-Shi,
Japan.

*Prof. Kasuo Yamasaki, Institute
of Pharmaceutical Sciences,
Faculty of Medicine, Hiroshima
University Kasumi, Minami-ku,
Hiroshima 734-8551, Japan.*

Tel.: +81 82 257 5285

Fax: +81 82 257 5289

E-mail:

*yamasaki@pharm.hiroshima-
u.ac.jp*

2002

Polymer Characterization

7–11 January 2002

10th International Conference on
Polymer Characterization
(POLYCHAR), Denton, Texas,
USA.

*Dr. Witold Brostow, Department
of Materials Science, University
of North Texas, Denton, Texas,
76203-5310 USA*

*Tel.: + 1 940 565 4358, -3262,
or 4337*

Fax: +1 940 565 4824

*E-mail: brostow@unt.edu or
polychar@marta.phys.unt.edu*

Visas

It is a condition of spon-
sorship that organizers of
meetings under the aus-
pices of IUPAC, in consid-
ering the locations of such
meetings, should take all
possible steps to ensure the
freedom of all bona fide
chemists from throughout
the world to attend irre-
spective of race, religion,
or political philosophy.
IUPAC sponsorship implies
that entry visas will be
granted to all bona fide
chemists provided applica-
tion is made not less than
three months in advance. If
a visa is not granted one
month before the meeting,
the IUPAC Secretariat
should be notified without
delay by the applicant.

Bioorganic Chemistry

12–15 May 2002

6th International Symposium on
Bioorganic Chemistry, Toronto,
Canada.

*Dr. Ronald Kluger, Department
of Chemistry, University of
Toronto, Toronto, Canada M5S
3H6.*

Tel.: +1 416 978 3582

Fax.: +1 416 978 3482

E-mail:

rkluger@chem.utoronto.ca

Polymer Science and Technology

2–5 December 2002

IUPAC Polymer Conference on
the Mission and Challenges of
Polymer Science and Technol-
ogy, Kyoto, Japan.

*Prof. Seiichi Nakahama, Faculty
of Engineering, Tokyo Institute
of Technology, 2-12-1
Ohokayama, Meguro-ku, Tokyo
152-8552, Japan.*

Tel.: +81 3 5734 2138

Fax.: +81 3 5734 2887

E-mail:

snakaham@polymer.titech.ac.jp

Chemistry International

2000, Vol. 22, No. 5 (September)



- 129 An Outlook for Chemistry in Chile in 2000
- 132 IUPAC Prize for Young Chemists
- 133 Air Quality in Denmark
- 136 Highlights from the Web
- 136 Reports from IUPAC-Sponsored Symposia
- 141 New Projects
- 144 News and Notices from Other Societies and Unions
- 145 Awards and Prizes
- 145 New Books and Publications
- 150 Provisional Recommendations
- 151 Reports from Commissions and Division Committees
- 153 Conference Announcements
- 157 Conference Calendar

ISSN 0193-6484

Chemistry International

The news magazine of the International Union of
Pure and Applied Chemistry (IUPAC)



2000, Vol. 22, No. 5 (September)

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

PUBLICATIONS MANAGER: Alan J. Senzel
PRODUCTION EDITOR: Cheryl Wurzbacher

All correspondence to be addressed to The Editor, *Chemistry International* (CI), IUPAC Secretariat, P. O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Telephone: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: edit.ci@iupac.org and <http://www.iupac.org/publications/ci/>

Subscriptions

Six issues of *Chemistry International* (ISSN 0193-6484) will be published bimonthly in 2000 (one volume per annum) in January, March, May, July, September, and November. The 2000 subscription rate is USD 99.00 for organizations and USD 45.00 for individuals. Subscription orders may be placed directly with the IUPAC Secretariat. Affiliate Members receive CI as part of their Membership subscription, and Members of IUPAC bodies receive CI free of charge.

Reproduction of Articles

Unless there is a footnote to the contrary, reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original in *Chemistry International*.

Periodicals postage paid at Durham, NC 27709-9998 and additional mailing offices. POSTMASTER: Send address changes to *Chemistry International*, IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757.

Front cover: Prof. Ernest Eliel (right), on the occasion of his nomination as an Honorary Member of the Chilean Chemical Society, receiving the award from Prof. Guillermo Contreras, President of the Society, at the 23rd Chilean National Meeting held in Valdivia, 24–27 November 1999. See article on page 129.

Printed by: Cadmus Journal Services, Easton, MD, USA

International Union of Pure and Applied Chemistry

International Union of Pure and Applied Chemistry (IUPAC)



President: A. HAYES (UK)
Vice President: P. S. STEYN (South Africa)
Past President: J. JORTNER (Israel)

Secretary General: E. D. BECKER (USA)
Treasurer: C. F. BUXTORF (Switzerland)

IUPAC Secretariat

P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Tel.: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: secretariat@iupac.org and <http://www.iupac.org>

The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary non-governmental, nonprofit association of organizations, each of which represents the chemists of a member country. Its objectives are as follows:

- to promote continuing cooperation among the chemists of the member countries
- to study topics of international importance to pure and applied chemistry which need standardization or codification
- to cooperate with other international organizations that deal with topics of a chemical nature
- to contribute to the advancement and understanding of pure and applied chemistry in all its aspects

The membership of IUPAC currently comprises 45 national organizations.

National Adhering Organizations

Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Österreichische Akademie der Wissenschaften (**Austria**)
Nationaal Comité voor Scheikunde/Comité National de Chimie (**Belgium**)
Brazilian Chemistry Committee for IUPAC (**Brazil**)
Bulgarian Academy of Sciences (**Bulgaria**)
National Research Council of Canada (**Canada**)
Sociedad Chilena de Química (**Chile**)
Chinese Chemical Society, Beijing (**China**)
Chemical Society located in Taipei (**China**)
Croatian Chemical Society (**Croatia**)
Czech National Committee for Chemistry (**Czech Republic**)
Det Kongelige Danske Videnskabernes Selskab (**Denmark**)
Academy of Scientific Research and Technology (**Egypt**)
Suomen Kemian Seura (**Finland**)
Comité National Français de la Chimie (**France**)
Deutscher Zentrallausschuss für Chemie (**Germany**)
Association of Greek Chemists (**Greece**)
Hungarian Academy of Sciences (**Hungary**)
Indian National Science Academy (**India**)
Royal Irish Academy (**Ireland**)
Israel Academy of Sciences and Humanities (**Israel**)

Consiglio Nazionale delle Ricerche (**Italy**)
Science Council of Japan (**Japan**)
Korean Chemical Society (**Korea**)
Kuwait Chemical Society (**Kuwait**)
Koninklijke Nederlandse Chemische Vereniging (**Netherlands**)
Royal Society of New Zealand (**New Zealand**)
Norsk Kjemisk Selskap (**Norway**)
Chemical Society of Pakistan (**Pakistan**)
Polska Akademia Nauk (**Poland**)
Sociedade Portuguesa de Química (**Portugal**)
Colegio de Químicos de Puerto Rico (**Puerto Rico**)
Russian Academy of Sciences (**Russia**)
King Abdulaziz City for Science and Technology (**Saudi Arabia**)
Slovak Chemical Society (**Slovakia**)
Slovenian Chemical Society (**Slovenia**)
National Research Foundation (**South Africa**)
Oficina de Ciencia y Tecnología (**Spain**)
Svenska Nationalkommittén för Kemi (**Sweden**)
Neue Schweizerische Chemische Gesellschaft (**Switzerland**)
Türkiye Kimya Dernegi (**Turkey**)
Royal Society of Chemistry (**United Kingdom**)
National Research Council, National Academy of Sciences (**USA**)
Union of Yugoslav Chemical Societies (**Yugoslavia**)

An Outlook for Chemistry in Chile in 2000

This article was contributed by Prof. Eduardo J. Delgado (Department of Physical Chemistry, Faculty of Chemical Sciences, Casilla 160-C, Universidad de Concepción, Concepción, Chile; E-mail: edelgado@udec.cl), Secretary of the Chilean Chemical Society.

Summary

This article surveys the history of chemistry in Chile as well as the current general aspects of research, human resources, graduate programs, and the main features of the Chilean Chemical Society.

History

Science, in general, was not important during the colonial period in Chile. Chemistry, in particular, underwent little development, with its activity limited to sporadic analyses of water and minerals. Teaching of chemistry on a regular basis, as well as some rudimentary research, began with the arrival of the Polish scientist Ignacio Domeyko, who was hired by the Chilean government to teach chemistry and mineralogy. In 1838, Domeyko founded the first laboratory of chemical analysis at the Colegio de Coquimbo. Domeyko was aware that science was the basis for economic development, and he, therefore, stressed the theoretical and practical study of chemistry and physics. In his laboratory, he trained the first Chilean chemists, who later became the chemistry teachers of the next generations.

As the 19th century was drawing to a close, the Chilean government hired German scientists to teach and develop the basic sciences in the country. However, by that time chemistry was regarded solely as an ancillary discipline in the study of other specialties, such as engineering, medicine, or pharmacy. As recently as the early part of the 20th century, the situation had not changed appreciably; chemistry was still limited to a secondary role within the academic environment.

In the 1940s, even though a state policy for science was yet to be defined, the chemical community began to organize in small groups, mainly within the universities [1]. Thus in 1944, on the 25th anniversary of the Universidad de Concepción, the First Chilean Congress of Chemistry was held. At this congress, the bases for the future foundation of the Chilean Chemical Society were laid down, and the Society was officially established on 12 December 1946. The first issue of the Society's journal, the *Boletín de la Sociedad Chilena de Química*, ap-



Prof. Ernest Eliel (right), on the occasion of his nomination as an Honorary Member of the Chilean Chemical Society, receiving the award from Prof. Guillermo Contreras, President of the Society, at the 23rd Chilean National Meeting held in Valdivia, 24–27 November 1999.

peared in March 1950. In 1967, the National Commission for Scientific and Technological Research (CONICYT) was created with three goals: (1) to promote and fund scientific research, (2) to establish graduate programs at the universities, and (3) to devise national policies for scientific development. A remarkable impetus for scientific research grew with the establishment of graduate programs in the 1970s.

Research

According to figures from the Institute for Scientific Information (ISI) [2], the Philadelphia-based institute that monitors scientific publishing trends, Chile produces more international papers per capita than Argentina and three times as many as Brazil and Mexico. The Chilean government spends about 0.67% of gross domestic product (GDP) on research—more than any other country in the region—yet far below developed countries such as the United States, Japan, or European countries that spend over 2% of GDP. As in most developing countries, the Chilean budget for research and development has been subject to large fluctuations throughout the country's history. Such budget variations denote the lack of a stable policy for science and technology in Chile, unlike the situation in more developed countries where a fairly stable budget is observed over time. This fact reveals that research, historically, has not been considered an important activity for the country.

The Chilean government supports peer-reviewed research through its National Commission for Scientific and Technological Research (CONICYT) [3]. CONICYT spends most of its budget on two funding programs: (1) the National Fund for Scientific and Technological Development (FONDECYT), which supports roughly 1 000 basic research projects for up to three years, and (2) the Fund for Fostering Scientific and Technological Development (FONDEF), which spends a roughly equal amount on projects with potential economic impact in priority areas such as mining, forestry, and agriculture. The government's participation in funding research has dropped since 1965 when it supported nearly 99% of research to a level of about 70% in 1997, mainly as a consequence of greater funding from industry. It is noteworthy that during this period, actual cash support of research by the government has increased; its lower percentage weight results from the appearance of alternative funding sources.

About 50% of the Chilean research budget goes to research universities, 25% is distributed throughout the country, and the rest is shared among government institutes and other institutions engaged in research. Government support accounts for nearly 95% of the funds devoted to research in the universities. Currently, around 95% of the R&D budget is devoted to basic and applied research; therefore, technological development is almost nonexistent. Since the establishment of FONDECYT in 1982, almost 7% of the total funds disbursed have been spent on chemistry research projects totaling 4 500 million pesos over the period 1982–1997.

One of the most important indices of R&D is productivity, namely, the number of original articles published in international journals. Although Latin American papers account for only about 1.8% of the total number of articles in the journals indexed by ISI, an analysis performed for *Science* [1] by ISI shows that since 1981 the Latin American share has risen substantially, from about 1.3% to the current level—an increase of 38.5%. Four countries—Brazil, Argentina, Mexico, and Chile—account for about 85% of the Latin American papers; the Chilean contribution to the Latin American total is 12%. The

number of articles published by Chilean authors in ISI-indexed journals has risen from 675 in 1981 to 1 489 in 1996—an increase that doubtless can be attributed to the FONDECYT program. In chemistry, these figures increased from about 50 in 1981 to about 200 at present, with an average relative impact factor for the period of nearly 0.5. Relative impact factor is a comparison parameter that measures the frequency of citations to scientific articles; the world average is set at 1.0 [4].

Human Resources

Financial support and human resources are the bases for scientific and technological development. It is internationally accepted that the number of scientists and engineers is an important parameter to measure the status of science and technology. In Chile,

the number of researchers, scientists, and engineers is low whether it is expressed as an absolute number or as a fraction of the total population. Chile has about 1.2 scientific professionals per thousand inhabitants in contrast to developed countries, where this number varies between 4

and 9 per thousand. Most of these researchers, scientists, and engineers are in universities (about 70%), and the remainder are distributed in institutes (nearly 20%), and industry (10%). The total number of scientific professionals working in Chilean universities is about 4 400, with nearly 400 of them devoted to chemical research.

Graduate Programs

Chile has five graduate programs [5] leading to a doctorate in chemistry; they are located at the Universidad de Chile (initiated in 1973), Pontificia Universidad Católica de Chile (1973), Universidad de Concepción (1975), Universidad de Santiago (1983), and Universidad Católica de Valparaíso (1983). These programs have similar admission requirements, which include the degree of Licenciado en Química or equivalent, two letters of recommendation, and an interview. To complete a doctoral program successfully, a student must pass 6–8 courses, a qualification examination in English, and a thesis presentation. The most important activity is the thesis, which must be an important and original contri-



Logo of the Chilean Chemical Society (SChQ)

bution to the development of an area of chemistry. The time required to complete the thesis varies between two and four years. Currently, all five Chilean doctoral programs are accredited by CONICYT, and financial support, via fellowships, comes from CONICYT, the Ministry of Education through the Improvement of High Teaching Quality Program (MECESUP), Fundación Andes, and the universities.

Since 1968, about 150 young Chilean scientists have received doctoral degrees in chemistry. Most of them have taken academic jobs; fewer than 20% have gone to industry.

The Chilean Chemical Society (SChQ)

The Chilean Chemical Society (SChQ) was founded in 1946 to promote all areas of chemistry, as well as to advise educational and government authorities. The society is organized by Regions (*Regionales*) and Divisions (*Divisiones*). Regions are centers that comprise members within a single city; the five Regions are based in La Serena, Valparaíso, Santiago, Concepción, and Valdivia. Divisions, as in other chemical societies, group people with interests in a particular branch of chemistry. Each Division organizes periodic meetings, seminars, and workshops. The Divisions currently include Catalysis and Adsorption, Macromolecules, Chemical Education, Natural Products, Inorganic Chemistry, Analytical Chemistry, and Environmental Chemistry. Each Region and Division has its own President and Council, elected by its members. Membership for both is open to all chemists in the Society, which now has about 400 members.

The SChQ organizes and supports a broad range of activities to enhance public awareness and promote a positive image of chemistry through a strong program of public lectures, public symposia, exhibitions, posters, and booklets. Every year, the Chemical Education Division organizes the Olimpiadas de Química (Chemistry Contests) aimed at enhancing interest in chemistry among high school students. Students from all over the country participate in this event. The winners later compete in the Olimpiadas Iberoamericanas de Química (Iberoamerican Contests), which are held in a different Iberoamerican country each year.

The national meeting of the Society is the Jornadas Chilenas de Química, which takes place every two years and includes academic and industrial chemists from all over the country. Graduate students play an important role at these meetings, where they have the opportunity to report and discuss their research results with the national chemical community.

The Society publishes the *Boletín de la Sociedad Chilena de Química*, which is a quarterly journal

reporting original research in all areas of chemistry. Its first volume was published in March 1950, and its current volume is No. 45, whose first number was published in March 2000. The *Boletín* is indexed in *Current Contents* and the *Science Citation Index*, and it is currently one of the Iberoamerican journals with a high relative impact factor—quite an accomplishment for a Society as small as the SChQ. The *Boletín* is sent to all members of the Society. Currently, the SChQ web site is at <http://www.schq.cl>.

At present, the Chilean Chemical Society participates actively in several international scientific organizations, including the International Council for Science (ICSU), Federación Latinoamericana de Asociaciones Químicas (FLAQ), Pacific Basin Societies (PBS), and IUPAC. The SChQ maintains permanent exchange programs with the American Chemical Society (ACS), as well.

Closing Remarks

The most important goals of the SChQ are to enhance awareness of the importance of science in general and of chemistry in particular in everyday life. This message must be brought home at three different levels. First, and most important, it must reach the younger generation of Chileans, represented by pre-high school students. Second, government authorities must also be included in the scheme. Finally, the public at large needs to accept the inherent need for and benefit of science in the contemporary world. The general population also needs to consider large numbers of scientists and institutions doing research as a reason for national pride and not as a bothersome liability.

Many problems and obstacles remain, but the achievement of the national chemical community in the last 50 years leads us to regard the future of chemistry in Chile with sound optimism.

References

1. T. González Abuter. *Sociedad Chilena de Química 50 Años al Servicio de la Ciencia, 1946–1996*. Sociedad Chilena de Química (1996).
2. C. Macilwain. *Nature*, Supplement to Vol. 398, No. 6726, 1 April 1999.
3. *Indicadores Científicos y Tecnológicos*, Enrique Dellacasa (Ed.), CONICYT (1998).
4. *Science in Latin America* in *Science* **267**, 808–827 (1995).
5. *Programas de Postgrado en Química de las Universidades Chilenas*, Guillermo González (Ed.), Sociedad Chilena de Química (1994).

IUPAC Prize for Young Chemists

Winners of the 2000 Prize

Winners of the 2000 IUPAC Prize for Young Chemists, as announced recently, are Alberto Credi, Università di Bologna, Italy; Hiroyuki Isobe, University of Tokyo, Japan; Vijaya J. Patil, National Chemical Laboratory, Pune, India (currently with Hindustan Lever Research Centre, Bangalore, India); and Chandra Saravanan, University of Massachusetts, Amherst, Massachusetts, USA (currently at the University of California, Berkeley). The four winners will each receive a cash prize of USD 1 000 and a free trip to the IUPAC Congress, 1–6 July 2001, Brisbane, Australia. Each prize winner will also present a poster at the IUPAC Congress describing his/her award-winning work.

The IUPAC Prize was initiated this year for the best Ph.D. thesis in the chemical sciences, as described in a 1 000-word essay. The essays describing the winners' theses can be found on the IUPAC web site (http://www.iupac.org/news/prize/2000_winners.html) and cover a wide range of subject matter: Dr. Credi, "Molecular-Level Machines and Logic Gates"; Dr. Isobe, "Design and Synthesis of DNA Binding Organofullerene"; Dr. Patil, "Electrostatically Controlled Formation of Nanocomposite Thin Films with Organic Matrices"; Dr. Saravanan, "Physical Chemistry of Organic Molecules in Nanoporous Materials".

There were 59 applicants from 24 countries. The Prize Selection Committee comprised Members of the IUPAC Bureau with a wide range of expertise in chemistry. The Committee was chaired by Dr. Joshua Jortner, Professor of Chemistry at Tel Aviv University and Past President of IUPAC. Prof. Jortner commented on the high quality of the applications and said, "I am very happy with the results. The IUPAC Prize will constitute a significant contribution to the standards of international chemical sciences and to the image of IUPAC."

In view of the quality of many applications, the Committee decided also to give five Honorable Mention awards to Tamara V. Basova, Institute of Inorganic Chemistry, Siberian Branch of the Russian Academy of Science, Novosibirsk, Russia; Olivier P. Haeffliger, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland (currently with Firmenich SA, Geneva, Switzerland); Harri Hakala, University of Turku, Finland; Mallela M. G. Krishna, Tata Institute of Fundamental Research, Mumbai, India (currently at the University of Pennsylvania

School of Medicine, Philadelphia, Pennsylvania, USA); and Joselito P. Quirino, Himeji Institute of Technology, Kamigori, Japan (currently at Stanford University, Palo Alto, California, USA). The Honorable Mention Award winners will receive a cash prize of USD 100 and a copy of the *Compendium of Chemical Terminology*, the IUPAC "Gold Book".

The awards to the four winners of the IUPAC 2000 Prize and the winners of the IUPAC 2001 Prize will be made during the Grand Opening session of the IUPAC Congress in Brisbane, Australia. Applications for the 2001 Prize are now being solicited, as described below.

Announcement of the 2001 Prize

The IUPAC Prize for Young Chemists has been established to encourage outstanding young research scientists at the beginning of their careers. The prize will be given for the most outstanding Ph.D. thesis in the general area of the chemical sciences, as described in a 1 000-word essay.

IUPAC will award up to four prizes annually. Each prize will consist of USD 1 000 cash and travel expenses to the next IUPAC Congress. In keeping with IUPAC's status as a global organization, efforts will be made to assure fair geographic distribution of prizes.

Prizes will be presented biennially at the IUPAC Congress (next Congress: 1–6 July 2001, Brisbane, Australia). Each awardee will be invited to present a poster on his/her research and to participate in a plenary award session.

Applications must be submitted, as described below, to the IUPAC Secretariat. In addition, some IUPAC National Adhering Organizations are soliciting applications in their own countries, frequently in conjunction with a national award. In such cases, applications may be submitted to the NAO or to the Secretariat (not both). A list of participating countries is given on the IUPAC web site, <http://www.iupac.org/news/prize.html>.

Applications will be judged by a committee of eminent scientists appointed by the President of IUPAC.

Procedures for the 2001 Prize

- a. Entrants must have received their Ph.D. (or equivalent) degree, or completed all Ph.D. requirements including successful defense of the

- doctoral thesis, during calendar 2000 in any of the 60 countries that are Members or Associate Members of IUPAC. Entrants need not be citizens or residents of one of these countries at the time the application is submitted.
- b. The research described in the entrant's thesis must be in the field of the chemical sciences, defined as "chemistry and those disciplines and technologies that make significant use of chemistry."
 - c. The IUPAC Prize recognizes only work that was performed while the entrant was a graduate student.
 - d. Application requires submission of a completed entry form (available on the IUPAC web site at <http://www.iupac.org/news/prize.html>), together with the material listed in items *e* and *f*. The entry form and supporting material should be submitted by e-mail whenever feasible. Additional material may be sent as needed by fax or mail.
 - e. An essay must be submitted by the entrant that describes his or her thesis work and places it in perspective relative to current research in the chemical sciences. The essay must be written in English by the entrant and may not exceed 1 000 words. (For applications submitted through NAOs, a national language may be permissible, and the NAO will assist in translation to English. The announcement by the appropriate NAO should be consulted.)
 - f. Two supporting letters (sent by e-mail if feasible) are required from the thesis adviser and/or chairman of the thesis committee and one additional faculty member. These letters should comment on the qualifications and accomplishments of the applicant and the significance of the thesis work.
 - g. Complete applications must be received at the IUPAC Secretariat by 1 February 2001. If submitted through an IUPAC National Adhering Organization or Associate NAO, the deadline established by the NAO must be met. Early submission is strongly encouraged so that any questions may be resolved before the deadline date.
- Visit the IUPAC web site at <http://www.iupac.org/news/prize.html> for complete information and an application form.

Air Quality in Denmark

This article is one in a series by IUPAC's Commission on Atmospheric Chemistry (VI.2) about air quality in IUPAC member countries. It was contributed by Ole Hertel (E-mail: Ole.Hertel@dmu.dk; Tel.: +45 4630 1148; Fax: +45 4630 1214; Web site: www.dmu.dk/AtmosphericEnvironment/netw.htm), Finn Palmgren, Thomas Ellermann, Henrik Skov, Kåre Kemp, Mads F. Hovmand, and Jørgen Brandt of the National Environmental Research Institute, Department of Atmospheric Environment, P.O. Box 358, Frederiksborgvej 399, 4000 Roskilde, Denmark.

Denmark is situated in Northern Europe in a generally cool, windy, and moist coastal climate. Air pollution levels are usually moderate compared with Southern and Eastern Europe, which have higher emission densities and more intense photochemical activity. However, the environmental impact of air pollution still gives rise to concern, principally because of health effects owing to human exposure to fine and ultrafine particles. Other issues include nitrogen deposition that contributes to eutrophication of coastal waters, damage to sensitive terrestrial ecosystems owing to atmospheric deposition of nutrients and acidifying compounds, and ozone stress.

Air quality monitoring is carried out within the Danish Urban Air Quality Monitoring Program [1]

and the Nationwide Danish Monitoring Program [2] for air quality in the rural areas. Data from these programs can be accessed from the following web site: www.dmu.dk/AtmosphericEnvironment/netw.htm. Current guidelines are not exceeded in Danish cities, and future European Union (EU) guidelines are expected to be met as well [3]. Measurements are supplemented with model calculations, and recently this effort has been extended with an operational Danish air pollution forecasting system, THOR [4], from which results are also accessible on the Internet.

The Danish urban monitoring program was established in 1982, and it currently comprises a network with stations in three cities (a fourth city will soon be included). Monitoring is carried out through cooperation among the Danish Environmental Protection Agency, the National Environmental Research Institute (NERI), the Greater Copenhagen Air Monitoring Unit, and the municipal authorities in the cities of Odense and Aalborg. NERI is responsible for operating the program together with the Agency of Environmental Protection of Copenhagen, the Environmental and Food Control Agency of Funen, and the Department for the Environment and Urban Affairs of Aalborg. Data are published in quarterly reports in Danish and are summarized in an-

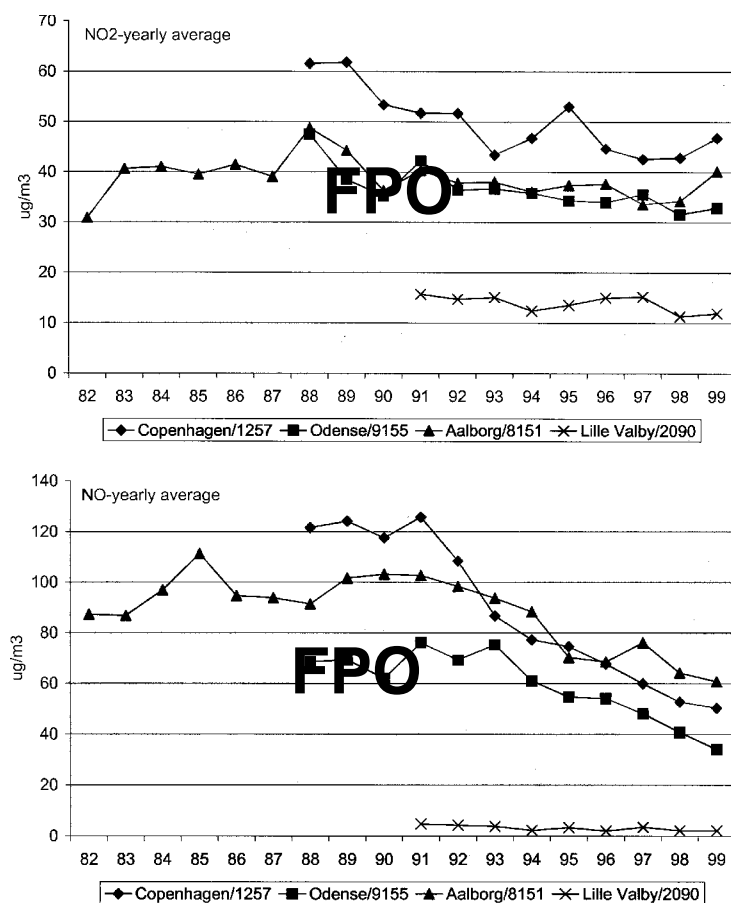


Fig. 1 Concentrations of nitrogen oxides at Danish Urban Air Quality stations from 1982 to 1999.

nual reports in English [1]. Data are also available on the Internet.

Various actions have had a pronounced positive effect on urban air quality in Danish cities. Lead pollution has been reduced by a factor of about 50 since 1982 as a result of the removal of lead from gasoline. A reduction of benzene content in gasoline from approximately 3.5% in 1994 to around 1% in 1998, together with the introduction of Three-Way Catalytic (TWC) converters, led to a substantial reduction in ambient benzene concentrations, as revealed in a recently concluded personal exposure study on benzene [5]. The introduction of TWC has, in general, reduced emissions of hydrocarbons, nitrogen oxides, and carbon monoxide from individual passenger cars considerably (typically about 90%). Based on actual kilometers traveled, the percentage of gasoline cars having TWC is estimated to be about 67%. This reduction is evident in the observed trends in nitrogen monoxide (NO) from the monitoring stations (Fig. 1), whereas the trend for the more harmful nitrogen dioxide (NO₂) is much less pronounced. In vehicle exhaust, NO usually accounts for about

90 to 95% of the nitrogen oxide (NO + NO₂) emissions, but NO₂ is formed in a rapid reaction between NO and ozone in ambient air, usually with ozone as the limiting factor for NO₂ formation in streets. Ambient ozone is mainly a result of long-range transport from Central and Eastern Europe, and local emission reduction strategies have, therefore, had only limited effect on NO₂ concentrations in streets in Danish cities. Impact studies of the new EU vehicle emission standards show that air quality in Danish cities will improve further [3].

Concentrations of total suspended particulate (TSP) matter have also decreased, partly as a result of reduced sulfur emissions. There are indications, however, that health effects may be related to fine and ultrafine particles rather than to particle mass. Various research activities have, therefore, been initiated to explore the characteristics (size, distributions, chemical compositions, etc.) of particle pollution in urban areas, and thereby to provide the tools for determining the most efficient reduction strategies [6,7].

The Nationwide Danish Background Monitoring Program was established in 1989, and results are reported annually [2,8]. The program assembles information on nutrient input to the Danish aquatic and forest ecosystems. Turnovers are frequently observed in Danish coastal waters and lead in worst-case situations to the death of fish and benthic fauna. Air quality and precipitation measurements are currently performed at eight locations selected to represent coastal and island-based areas, as well as inland areas. At all sites, bulk collectors capture precipitation over semimonthly periods. The samples are analyzed for their content of nutrients and metal ions. Furthermore, six stations are equipped with filter pack samplers to collect compounds in the gas and particle phases.

In the later years, a decrease in atmospheric nitrogen concentrations is evident from the observations (Fig. 2). A similar tendency has been observed for wet depositions, although the decrease is less pronounced, owing to dependency on the precipitation amount. Atmospheric nitrogen deposition to coastal waters, however, contributes significantly to the overall loads. For inner Danish waters, estimates have shown that the atmosphere contributes about

30 to 40% of the total nitrogen loads.

The measurements in Danish monitoring programs are supplemented by model calculations. In the urban monitoring program, calculations with the carefully validated Operational Street Pollution Model (OSPM) [9] allow for estimates of concentration levels in streets without monitoring, and make it possible to evaluate the effects of various actions toward reduction of pollution from urban traffic. In the background monitoring program, the Atmospheric Chemistry and Deposition (ACDEP) [10] model is used to study the geographical distribution of nitrogen deposition to Danish marine waters, and to evaluate source–receptor relationships.

Data from THOR [4] have recently been released on the Internet. THOR is an integrated modeling system based on weather forecasts from the ETA model [11], on air pollution forecasts derived from a long-range transport pollution model known as the Danish Eulerian Operational Model (DEOM), on the Urban Background Pollution Model (UBM), and on the Operational Street Pollution Model (OSPM).

References

1. K. Kemp and F. Palmgren. The Danish Air Quality Monitoring Program. Annual Report for 1998. NERI, Tech. Rep. No. 296, 64 p. (1999).
2. H. Skov, O. Hertel, T. Ellermann, C. Ambelas Skjøth, N. Z. Heidam. NOVA 2003, Atmospheric Deposition of Nitrogen (in Danish). NERI, Tech. Rep. No. 289, 102 p. (1999).
3. S. S. Jensen, R. Berkowicz, M. Winther, F. Palmgren, Z. Zlatev. Future Air Quality in Danish Cities. Impact Study of the New EU Vehicle Emission Standards, Technical Report available at www.mst.dk (2000).
4. J. Brandt, J. H. Christensen, L. M. Frohn, R. Berkowicz, F. Palmgren. The DMU-ATMI THOR Air Pollution Forecast System—System Description,

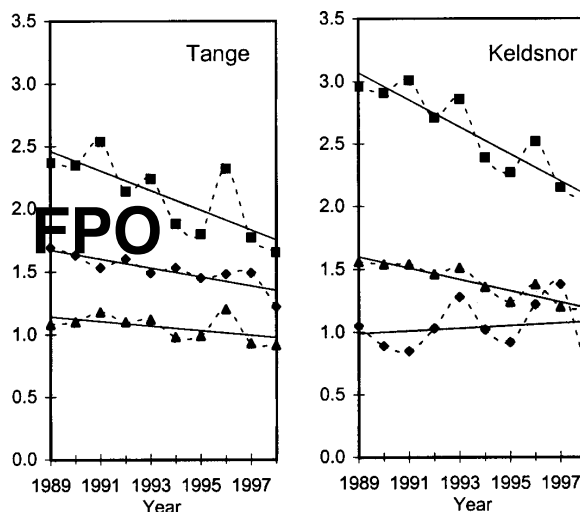


Fig. 2 Annual mean concentrations of ammonia (◆), particle phase ammonia (■), and the sum of nitric acid and nitrate (▲) from the monitoring stations on the island Anholt, and at Tange and Keldsnor for the years 1989 to 1998.

- NERI, Tech. Rep. No. 321, 60 p. (2000) available at www.dmu.dk.
5. H. Skov, A. B. Hansen, G. Lorenzen, H. V. Andersen, P. Løfstrøm, C. S. Christensen. Benzene Exposure of People Living and Working in Copenhagen. Submitted to *Atmospher. Environ.* (1999).
6. F. Palmgren, P. Wählin, R. Berkowicz, R. van Dingenen. Fine Particles from Traffic. EUROTRAC Symposium 2000. March 25–31, 2000. Garmisch-Partenkirchen, Germany. To appear (2000).
7. P. Wählin, F. Palmgren, R. van Dingenen. Experimental Studies of Ultrafine Particles in Streets and the Relationship to Traffic. To appear in *Atmospher. Environ.* (2000).
8. M. F. Hovmand, L. Grundahl, O. H. Manscher, A. Egeløv, H. V. Andersen. Atmospheric Deposition on Danish Forests, Data Report 1992/93 (in Danish), NERI, Tech. Rep. No. 122, 63 p. (1994).
9. R. Berkowicz, O. Hertel, N. N. Sørensen, J. A. Michelsen. In *Modeling Air Pollution from Traffic in Urban Areas. Flow and Dispersion Through Obstacles*, R. J. Perkins and S. E. Belcher (Eds.). Clarendon Press, Oxford, 121–142, (1997).
10. O. Hertel, J. Christensen, E. H. Runge, W. A. H. Asman, R. Berkowicz, M. F. Hovmand, Ø. Hov. *Atmospher. Environ.* **29**, 11, 1267–1290 (1995).
11. S. Ničkov, D. Mihailović, B. Rajković, A. Papadopoulos. The Weather Forecasting System SKIRON, Vol. II. Description of the Model, University of Athens Report, 228 p. (1998).

Highlights from the Web

e-news from www.iupac.org

It seems like yesterday that the IUPAC web site was about eight pages, and back then it was easy to keep up with new developments. For the last two years, we have enhanced the information made available to you via this new medium. We still have plenty of ideas to improve the site, and, as someone once said, "the best is yet to come!" We feel, however, that it is now time to reach out to you by e-mail to let you know what's new at IUPAC and its web site. So, here it is; on 28 June 2000, we sent the first IUPAC e-news, an e-mail newsletter about IUPAC and its web site, to about 1 200 persons, the combination of all of our different mailing lists. Unfortunately, this initial mailing list does not include all the current readers of *Chemistry International*. If you are inter-

ested in joining this list and did not receive the first e-mail, please visit <http://www.iupac.org/news/e-news.html>. From that page, you can take a look at the first message and subscribe if you want. This mailing group is not restricted to IUPAC, and anyone can join. If you think that a friend or colleague might find IUPAC e-news useful, don't forget to pass them the address.

For questions regarding the list, including how to subscribe or unsubscribe, where to submit an item, or to report a problem, visit the e-news page at <http://www.iupac.org/news/e-news.html>.

E-mail your suggestions, comments, questions, etc., to fabienne@iupac.org. See you online!

Fabienne Meyers
IUPAC Secretariat

Reports from IUPAC-Sponsored Symposia

Chemistry and the Internet, 25–27 September 1999, Washington, DC, USA

This conference was the second in a series of annual meetings; the web site is at <http://www.chemint.org>. In 1999, there were five sessions on electronic ("e-") issues, including e-commerce, e-publishing, education, corporate Internet and intranet strategy, and databases. The first, second, and fourth sessions were followed by lively discussions led by a panel of experts. Bill Town of ChemWeb opened the first session, explaining why so many companies are rushing into e-commerce. Despite the costs (up to USD 40 million to set up a storefront) and the current unprofitability of most ventures, the long-term gains could be tremendous. "E-commerce is not easy, it's not cheap, and it's *not optional*".

In the publishing arena, first, Chris Parkinson, Environmental Molecular Sciences Laboratory (EMSL), demonstrated the EMSL Desktop, a new collaborative authoring environment that allows multiple users in different, geographically remote institutions, to read and write multiple documents, on multiple heterogeneous platforms. EMSL Desktop has moved away from applet technology and is now more like a "desktop" on a desktop, allowing "drag and drop", and application launching.

Bob Bovenschulte of ACS Publications answered ten big questions about e-journals:

- Does electronic publishing reduce costs?
- Is faster better?
- How should the electronic archive be maintained?
- What is the outlook for pricing models?
- Who should own the copyright to journal articles?
- Should all the sciences adopt the preprint/e-print model?
- Should peer review be redefined?
- Who should link to whom, and how?
- Will secondary publishers become obsolete?
- What is the government's proper role in scientific publishing?

Steven Bachrach of Trinity University gave a progress report on the *Internet Journal of Chemistry (IJC)*. Targets include full incorporation of multimedia, promotion of Internet technologies, low cost, and liberal copyright policies. *IJC* is peer-reviewed and covers all areas of chemistry.

In the education session, Donald DeCoste described web-based homework assignments at the University of Illinois at Urbana-Champaign, Karl Harrison demonstrated the incorporation of multimedia into courseware at the University of Oxford, and Lon Mathias showed how the Polymer Science Learning Center at the University of Southern Mis-

Mississippi web site makes polymer information free and fun. Robert Lancashire's site at the University of the West Indies gets many visitors because it is the home of the JCAMP-DX data viewer for Windows. Lancashire discussed interactive web page development with Chime and Java. Alan Arnold of the Australian Defence Force Academy talked about MetaChem, a web gateway to international print and electronic sources of chemical information. Sites are evaluated, described, classified, and indexed, and a database of metadata has been set up.

Yvonne Martin of Abbott Laboratories was the first speaker in the corporate intranet program. She is developing a web tool that enables bench chemists to discover structure–property–activity relationships. ChemSymphony “Beans”, from Cherwell Scientific, are being used. Lewis Jardine, of Cherwell, talked about these Java beans in a later session. Tom Pierce's talk concerned web culture at Rohm and Haas, while Achim Zielesny described the impressive integrated chemistry system that has been built on the Bayer intranet.

On the final day, Stephen Boyer of IBM described an intellectual property “infobank” based on IBM's patent services on the Net; one of them is free, and the other, a “Gold” site, is for paid use by businesses. IBM also offers data mining and visualization tools. Next, Gary Mallard of the U.S. National Institute of Standards and Technology (NIST) talked about the NIST Chemistry WebBook and the (free) use of chemistry reference data on the web. It was interesting to relate this talk to an earlier one on database protection by Jerome Reichman of Vanderbilt University, School of Law. Reichman is anxious to encourage the “sharing ethos”, and he fears that database protection could impede the progress of science and innovation.

In the final presentation (coauthored by Wolf-Dietrich Ihlenfeldt and Frank Oellien at the University of Erlangen-Nürnberg), Marc Nicklaus of the U.S. National Cancer Institute (NCI) demonstrated the enhanced “CACTVS” software for browsing the open NCI database. A free Internet system, called Erlangen/Bethesda Data and Online Services, offers sophisticated facilities, including chemical structure handling, and 3D pharmacophore search.

The conference attendance was not so large as to discourage networking and audience participation, yet countries from East and

West and from both hemispheres were represented. A detailed record of the Proceedings, with links to related web sites, is available at <http://www.warr.com/chemnt99.html>.

Chemistry and the Internet (ChemInt2000) will be held again 23–26 September 2000 at Georgetown University, Washington, DC, USA (see <http://www.chemint.org/>).

Dr. Wendy A. Warr

**Wendy Warr & Associates, Cheshire, England, UK
Chairman, IUPAC Committee on Printed and
Electronic Publications (CPEP)**

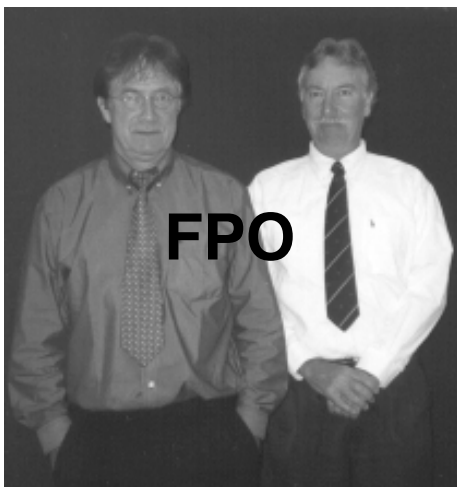
**UNESCO Preconference Workshop,
8–9 April 2000, and UNESCO School
and IUPAC Conference on
Macromolecules and Materials Science,
10–12 April 2000,
Matieland, South Africa**

This collaboration between UNESCO and IUPAC, organized by Prof. Ron Sanderson of the University of Stellenbosch, Matieland, South Africa (E-mail: rsd@land.sun.ac.za), attracted 160 attendees, of whom 66 came from countries other than South Africa. Good representation from the African continent included delegates from Zimbabwe, Kenya, Botswana, Namibia, Lesotho, and Nigeria. The large number of students who actively participated in the weeklong proceedings was most gratifying.

At the UNESCO Preconference Workshop, 1 local speaker and 17 international speakers presented informative lectures on introduction to polymers,



University of Stellenbosch campus, Matieland, South Africa



Prof. J. C. Jansen and R. D. Sanderson

chain polymerization reactions, polymer degradation and stabilization, polymer recycling, and analysis and characterization of polymers.

Prof. P. S. Steyn, IUPAC Vice President, opened the UNESCO School and IUPAC Conference with greetings from IUPAC, and he was followed by 24 plenary lecturers from 10 countries. Scientists from another 3 countries presented invited talks. Highlights of the conference included the following:

- excellent work on plastics recycling, described by Dr. Hans Zweifel from Basel, Switzerland;
- a new stopflow kinetic device developed by Prof. Minoru Terano of the Advanced Institute of Science and Technology in Japan for measuring reaction kinetics in Ziegler-Natta and metallocene polymerizations;
- an excellent overview of self-assembly nanomaterials given by Prof. Samuel I. Stupp of Northwestern University, Evanston, Illinois, USA, followed by a thermodynamic prediction of nanostructure synthesis by Dr. Lionel Vayssieres of Dr. Anders Hagfeldt's research group at Uppsala University, Sweden;
- a description of new colloidal copying of organic structures by Prof. R. D. Sanderson and Charl Faul of Stellenbosch University in collaboration with Prof. Dr. Markus Antonietti of Max-Planck-Institut in Golm, Germany;
- a discussion by Dr. Ioan Tincul of Sasol Technology, Modderfontein, South Africa, of the newer polyolefins, synthesized by Ziegler Natta, and the new propene pentene copolymer with low haze currently being commercialized by the Sasol subsidiary Polifin;
- a fine overview of the newest findings on "living-free" radical polymerizations presented by the group of Dr. Bert Klumperman (Eindhoven University of Technology, Netherlands), Axel

Müller (University of Bayreuth, Germany), Stefan Bon (University of Warwick, England, UK), and San Thang (CSIRO, Australia); and

- an exciting discussion of new techniques for materials processing with supercritical fluids, with emphasis on applications to polymers, presented by Prof. Gerda van Rosmalen of Delft University, Netherlands.

Concluding remarks given by top technical people from industry included summaries of the following topics:

- South African coatings technology priorities (Dr. Boyd Cooray, Plascon Paints, Johannesburg, South Africa);
- quietly improving the quality of life (Bryan Webster, Rohm & Haas, South Africa);
- acrylic emulsion polymers for future paints (R. Baumstark, BASF AG, Germany);
- Revertex's development needs (Technical Director, Revertex, South Africa); and
- Polifin's technology goals (Mrs. Karol Camerol, Polifin, Modderfontein, South Africa).

In concluding, the group stressed the importance of training in polymer science and chemistry in South Africa at the postgraduate level to the South African economy and the associated need to establish technical competencies. The overseas plenary speakers were very agreeable to assist thereby in augmenting the goals of UNESCO and IUPAC. The conference banquet at the famous Boschendal wine estate, close to Franschhoek, was greatly enjoyed by all who attended it.

A virtual encyclopedic CD-ROM that incorporates the abstracts and overheads given by all the plenary speakers at both the School and Conference has been created. This CD-ROM provides an excellent tool for teaching and expanding course notes and was made available to all delegates. It is also available at USD 50 a copy through the Institute for Polymer Science Conference web site, <http://www.sun.ac.za/polymer/polymer.html>. It will be placed in an abridged form on the web site after approval by each of the contributors.

Announcements of the 2001 (4th, Johannesburg) and 2002 (5th, Stellenbosch) conferences appear on pages 153 and 155, respectively, of this issue.

Prof. P. S. Steyn
IUPAC Vice President
Prof. R. D. Sanderson
Conference Chair
University of Stellenbosch
Matieland, South Africa

10th International IUPAC Conference on High-Temperature Materials Chemistry (HTMC-X), 10–14 April 2000, Jülich, Germany

The IUPAC conferences on High-Temperature Materials Chemistry were initiated by the Inorganic Division's Commission on High-Temperature Materials and Solid State Chemistry (II.3) in 1977 and have become the premier international venue for exploring the combination of chemistry and materials science as these affect understanding, production, and use of high-temperature materials. As part of its service to the high-temperature and materials chemistry communities, IUPAC Commission II.3 has provided overall organization and continuity of the series, along with selection, coordination, and guidance of the individual-conference local organizers. This tenth conference in the series was held 10–14 April 2000 in Jülich, Germany. It was organized by Prof. Klaus Hilpert of the Forschungszentrum Jülich with the help of F. Froben and L. Singheiser. The Jülich conference provided significant opportunities for productive interchange between basic and applied researchers, with particular emphasis on applications of thermodynamics, of modern diagnostics, and of corrosion studies to the high-temperature processing and chemical behavior of bulk materials and coatings, and to high-temperature light sources.

There were about 250 papers and 250 participants from 26 countries at this highly successful, fully subscribed meeting. International participation was facilitated by a generous grant from the German Science Foundation to support attendance by scientists from the former "East". To ensure productive dialog between basic science and applications—and among industrial, research laboratory, and academic scientists—the conference, following tradition, was held with no parallel sessions and with lots of opportunities for formal and informal discussion. The majority of the papers were presented in poster sessions. In addition, there were 7 invited lectures, 17 keynote lectures, 41 shorter oral presentations, and 7 hands-on demonstrations of computerized thermodynamic databases.

Main lectures to be published in a future issue of *Pure and Applied Chemistry* introduced the following different topics and sessions: hydrocarbon oxidation

kinetics (J. Warnatz, IWR, Heidelberg, Germany); laser vaporization for mass spectrometric studies at 3000–5000 K (J. Hastie, NIST, Gaithersburg, Maryland, USA); containerless levitation methods to produce and study high-temperature liquids (P. Nordine, Containerless Research, Evanston, Illinois, USA); thermodynamic models for use in computer databases (M. Hillert, KTH, Stockholm, Sweden); transport processes between the 1000 K wall and the 3600

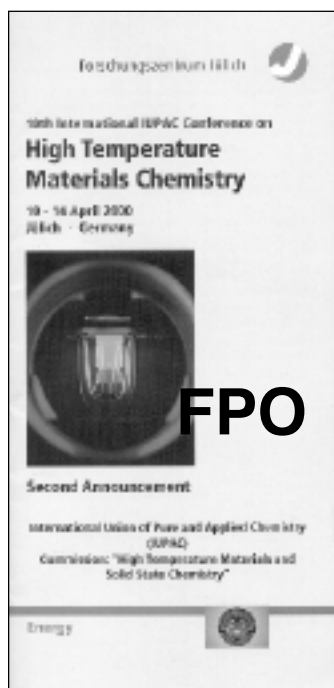
K electrode in metal halide gas discharge lamps (W. van Erk, Phillips, Eindhoven, Netherlands); analysis of kinetic processes at solid–solid interfaces (H. Schmalzried, University of Hannover, Germany); and applications of chemical vapor deposition to produce tailored structural coatings (G. Wahl, Technical University Braunschweig, Braunschweig, Germany).

Keystone lectures by leaders of their fields comprised presentations discussing and using varied techniques, including high-temperature mass spectrometry, molecular beam sampling, electric-field activated combustion synthesis, synchrotron X-ray studies of levitated liquids, and gas-phase electron diffraction determination of molecular structure; a number of forefront experimental and modeling studies of ceramic materials and oxides; and studies of alloys, fullerenes, carbon

nanotubes, and fuel cells. These papers, along with the other oral and poster presentations, illustrated the tremendous variety of physical and chemical techniques that are utilized, and of systems—technological and basic—that are studied under the umbrella of "high-temperature materials".

The two meetings that immediately preceded HTMC-X in this well-established and successful IUPAC series were in State College, Pennsylvania, USA (1997) and Vienna, Austria (1994). Following a pattern of meeting every three years on a different continent, the next conference, HTMC-XI, is scheduled for 2003. It will be held in Asia for the first time, in Tokyo, Japan, hosted by Michio Yamawaki of the University of Tokyo (yamawaki@q.t.u-tokyo.ac.jp).

Dr. Gerd M. Rosenblatt
Vice President, IUPAC Inorganic Chemistry Division (II)
Lawrence Berkeley National Laboratory
University of California, Berkeley

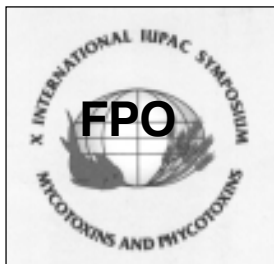


FPO

**10th International IUPAC Symposium on
Mycotoxins and Phycotoxins
(10th ISMP), 21–25 May 2000,
Guarujá, São Paulo, Brazil**

This series of conferences was initiated by the IUPAC Commission on Food (VI.5), and the first symposium was held in Kungälv, Sweden in 1973. Some eight symposia have taken place in subsequent years in venues as diverse as Pretoria, Tokyo, Mexico, and Rome. The meetings have developed a considerable reputation for the high quality of interdisciplinary scientific contributions, and they have become the principal international meetings on mycotoxins and phycotoxins. This tenth meeting in the series, which further enhanced this reputation, was held 21–25 May 2000 at the seaside resort of Guarujá near São Paulo, Brazil. The symposium was organized by the Instituto Adolfo Lutz (with the National Organizing Committee chaired by Dr. Myrna Sabino) and attracted some 306 participants from 57 countries.

The program was organized on the basis of a plenary session on mycotoxins and phycotoxins on the first day, followed by parallel sessions on subsequent days. In total, there were 61 oral contributions and 212 posters, with an accompanying small scientific manufacturers exhibition. The truly interdisciplinary nature of the symposium can be seen from the program, which covered global significance of mycotoxins and phycotoxins, analytical developments, quality assurance, proficiency testing, methods validation, sampling, risk assessment, occurrence and human exposure, toxicology, and mode of action. A significant proportion of the participants were from developing countries, and a roundtable on “Analytical methods for developing countries” and a session on “Research on mycotoxins in developing countries” were aimed at meeting their needs. In addition, an FAO-sponsored Analytical Quality Assurance Workshop for mycotoxins for Latin American participants preceded the symposium. The symposium program also included a roundtable on “Nomenclature for phycotoxins”, where the issue of novel phycotoxins—currently being identified with increasing frequency, yet being trivially and nonsystematically named—was recognized as a source of confusion and an area in which IUPAC should take a lead. It was, therefore, proposed that an Interdivisional Working Group on Nomenclature for Phycotoxins be established.



Organizing Committee of the 10th ISMP, left to right, seated: J. Gilbert, M. Sabino, B. Correa, and D. Rodriguez-Amaya; standing: W. de Koe and H. P. van Egmond.

A special committee selected the best oral presentation given at the symposium, awarding the “ILSI Brazil Award”—consisting of a certificate and USD 1 000—to Dr. V. Sewram from PROMEC, South Africa for his paper on “Hair: A noninvasive matrix for assessing chronic exposure to fumonisin mycotoxins”. The best poster presented at the symposium was recognized by the “BRASEQ Award”, consisting of a certificate and USD 500, which went to Dr. L. P. Keong of DSO National Laboratories, Singapore

for a poster on “The determination of domoic acid in aqueous samples using a solid-phase microextraction technique coupled to liquid chromatography”. Proceedings of the symposium, comprising the oral contributions, will be edited by Willem de Koe and published before the end of 2000; copies can be ordered from wjdekoe@bird.nl at a cost of USD 60.

The Commission on Food (VI.5) will be disbanded by the time of the next symposium, owing to the upcoming restructuring of IUPAC. In order, therefore, to ensure continuance of this important series of meetings, it was proposed that future meetings be cosponsored by AOAC International and that the 11th Symposium be held at the University of Maryland (College Park, Maryland, USA) in 2003 or 2004.

Prof. John Gilbert
Chairman, IUPAC Commission on Food (VI.5)
Ministry of Agriculture, Fisheries, and Food
Central Science Laboratory
Sand Hutton, York, England, UK

9th International Conference on
Polymer-Based Technology (POC'2000),
21–26 May 2000, Tianjin, China

This conference has a long and distinguished history, with its original focus on reactions of polymer-supported catalysts. It now covers a wide range of topics in high-tech applications of polymers. The Tianjin meeting followed the fine tradition of preceding ones. There were about 150 participants from about 15 countries; half of the participants were from the host country. The standard of plenary and contributed papers (including some excellent presenta-

tions from young Chinese scientists) was exemplary. POC'2000 is the first in the series of these meetings to be sponsored by IUPAC, and, we hope, not the last. It represents one of many instances where Chinese scientists support the goals of the Union for the promotion of international chemical science and technology.

Prof. Robert G. Gilbert
President, IUPAC Macromolecular Division (IV)
University of Sydney
New South Wales, Australia

New Projects

Visit <http://www.iupac.org/projects/> for complete information and further links.

Round-Robin Test on the Molecular Characterization of Epoxy Resins by Liquid Chromatography

Epoxy resins are an important group of synthetic resins with many application areas. Thus far, only relatively primitive analytical tests have been used for routine characterization of epoxy resins. The simple characteristics are often unable to discriminate between different samples, to find structure vs. properties relations, and to evaluate production reproducibility. Liquid-chromatographic characterization of epoxy resins has been reported in the literature, but no standard procedure has been established and no systematic study of the results obtained in different laboratories has been reported.

IUPAC has approved a project to run a round-robin test on the analysis of epoxy resins by liquid chromatography. Two different samples of solid bisphenol A-based epoxy resins are intended to be analyzed by conventional size exclusion chromatography (SEC), SEC coupled with a light-scattering detector or a viscometer, and high-performance liquid chromatography (HPLC). Participants in the test can choose to employ only one of the methods mentioned or to use all of them. Participants from research as well as production plant laboratories are welcome, and the requirements for the samples should be addressed to Martin Kaska, SYNPO, S. K. Neumann 1316, 532 07 Pardubice, Czech Republic, Tel.: +420 40 6304021; Fax: +420 40 6303333; E-mail: podzimek@pce.czn.cz.

See http://www.iupac.org/divisions/current_projects/2000/990211_400_00.html for project description and update.

Polyaniline: Recommendations for Preparation of Conducting Polymer and Its Colloidal Form

An ever-growing number of papers reflects the increasing interest in conducting polymers [1], in their processing, and in the studies of their specific forms, such as colloidal dispersions [2].

Conducting polymers belong to a family of synthetic metals, of which polyaniline is a typical representative. The inherent properties of polyaniline—polymer character, color, and electrical conductivity—in connection with the organic nature, predetermine links to the semiconductor physics; macromolecular, physical, and organic chemistry; and to analytical and materials sciences. Conducting polymers behave in an “intelligent” manner; that is, they respond to various external stimuli (temperature, humidity, presence of gases and vapors, acidity, oxidation, and reduction) by changing their electrical, optical, and chemical properties. They are used in sensing, detection, and various monitoring devices, as well as in the design of new materials.

This collaborative project, supported by IUPAC's Macromolecular Division (IV), has two basic goals. The first one is to define a simple protocol for the preparation of polyaniline, which, if followed, results in a product that has well-defined properties. Because colloidal dispersions of conducting polymers are important for their processing, the project will then establish the reaction conditions that lead to polyaniline that is colloiddally soluble in aqueous media. This project is being coordinated by Prof. Jaroslav Stejskal, a National Representative of IUPAC's Commission on Polymer Characterization

and Properties (IV.2), with participation of other members of the Commission. Any comments and suggestions are welcome and should be sent to the project coordinator, Dr. Jaroslav Stejskal, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, 162 06 Prague 6, Czech Republic. Tel.: +42 02 2040 3351; Fax: +42 02 367 981; E-mail: stejskal@imc.cas.cz.

See http://www.iupac.org/divisions/current_projects/2000/990241_400_00.html for project description and update.

1. A. G. MacDiarmid. *Synth. Met.* **84**, 27–34 (1997).
2. J. Stejskal, M. Špírková, A. Riede, M. Helmstedt, P. Mokreva, J. Prokeš. *Polymer* **40**, 2487–2492 (1999).

Solubility Phenomena—Applications for Environmental Improvement

IUPAC has approved a project for the detailed planning of a workshop, Solubility Phenomena—Applications for Environmental Improvement, to be held as part of the 10th International Symposium on Solubility Phenomena in Varna, Bulgaria in August 2002.

The following General Focus Statement has been agreed upon:

Solubility is a fundamental property of all substances and can greatly influence the composition of both naturally occurring and man-made chemical systems. In many of these systems, understanding the solubilities of the chemical components opens the door to alterations and manipulations of systems that may reduce the spread of pollutants, assist in the recycling of industrial wastes, and in other ways improve the quality of environments. This workshop will focus on the linkages between the fundamental chemistry of solubility and technology innovations that can lead to environmental improvements. Particular emphasis will be given to the solubility of industrial wastes and pollutants in aqueous systems.

The workshop's goal is to stimulate the production and communication of scientific information related to solubility in ways that are accessible and useful to environmental policy makers. In order to meet this goal, it is necessary to attract both leading scientists and government policy makers; therefore, the specific subject of the workshop is critical and should have the following three important characteristics:

- Solubility (broadly defined) should play an important role.
- There should be broad public concern on a regional and international level (perhaps with the

focus of Southeast Europe and/or the Eastern Mediterranean Basin-Black Sea area).

- Significant improvements should be possible at affordable cost if policy makers receive good scientific advice.

Planning for the workshop is directed toward the following five elements:

- identifying appropriate international bodies for collaboration, cosponsorship, and external funding;
- identifying specific environmental issues in and beyond the regional venue of the workshop (Southeastern Europe) to which improved knowledge of solubility can contribute;
- selecting workshop speakers and discussion leaders;
- devising means of outreach to environmental specialists; and
- securing external funding necessary for holding the workshop.

This project is being coordinated by Prof. David G. Shaw, Chairman of IUPAC's Commission on Solubility Data (V.8), with participation of other members of the Commission. Comments from the chemistry community are welcome and should be addressed to the project coordinator, Prof. David G. Shaw, Institute of Marine Science, University of Alaska, Fairbanks, Alaska 99775-7220, USA; Tel: +1 907 474 7723; Fax: +1 907 474 7204; E-mail: ffdgs@uaf.edu.

See http://www.iupac.org/divisions/current_projects/2000/990381_500_00.html for project description and update.

Structure and Properties of Cyclic Olefin Copolymers

Modification of general purpose polyolefin materials to enhance their performance characteristics to the level of engineering plastics is currently a hot topic of industrial as well as academic research. Copolymerization of ethylene with cyclic olefin monomers produces high-T_g, optically clear, low-shrinkage, low-moisture-absorption, and low-birefringence materials. Such materials are currently being produced by Mitsui Petrochemical, Hoechst Celanese, Japan Synthetic Rubber, and Nippon Zeon Co., and they are being used as packaging materials, plastic lenses, and new substrates for compact discs and other optical storage media. Processing of cyclic olefin copolymers is rather difficult, and the relationship between their rheological properties and their chemical structure needs to be well established. Incorporation of polar monomers such as acrylates

during copolymerization is sometimes employed to improve the adhesion properties. Surface characteristics exhibited with the inclusion of polar monomers also need to be analyzed.

IUPAC has approved a project to evaluate structure–property relationships of recently commercialized cyclic olefin copolymers by means of structure analysis, rheological measurement, surface characterization, and property estimation. This project is being coordinated by Prof. Sung Chul Kim, a Titular Member of IUPAC's Commission on Polymer Characterization and Properties (IV.2), with participation of other members of the Commission. Comments from the chemistry and polymer community are welcome and should be addressed to the project coordinator, Prof. Sung Chul Kim, Department of Chemical Engineering, Korea Advanced Institute of Science and Technology, 373-1 Kusongdong, Yusongku, Taejon 305-701, Korea; Tel.: 82 42 869 3914; Fax: 82 42 869 3910; E-mail: kimsc@mail.kaist.ac.kr.

See http://www.iupac.org/divisions/current_projects/2000/990391_400_00.html for project description and update.

Terminology of Polymers with Ionizable Groups and Polymers Containing Ions

Properties of several polymeric materials are related to the presence of ionic groups being either inherent fragments of polymer molecules or present in low-molecular-weight components of composite polymeric materials. The presence of both ionic and covalent bonds makes ionic polymers a very diverse group of materials, and their physical properties can vary from soft, pliable thermoplastics (e.g., ionomers) via rubbery elastomers to rigid, cross-linked materials (e.g., ion-exchange resins). The importance of this group of polymers stems from their widespread application in many areas of everyday life and industrial production.

IUPAC has approved a project to formulate clear concepts and definitions of terms related to the structure and properties of polymeric materials containing ionic or ionizable groups. The aim of this project is to eliminate the ambiguity and lack of precision often found in scientific and technical literature discussing chemistry and properties of ionic polymers. This project is being coordinated by Prof. Przemysław Kubisa, a Titular Member of IUPAC's Commission on Macromolecular Nomenclature (IV.I), with participation of other members of the Commission. Comments from the chemistry and polymer community are welcome and should be addressed to the project coordinator, Prof. Przemysław

Kubisa, Center of Molecular and Macromolecular Studies, 112 Sienkiewicza St., 90-363 Łódź, Poland; Tel.: +48 42 681 96 08; Fax: +48 42 68471 26; E-mail: pkubisa@bilbo.cbmm.lodz.pl.

See http://www.iupac.org/divisions/current_projects/2000/000061_400_00.html for project description and update.

Glossary of Terms Relating to Polymeric Gels and Networks, Hybrid Inorganic Polymeric Materials, and the Processing Thereof

This is a joint project of the Inorganic (II) and Macromolecular (IV) Divisions within the remit of the Materials Initiative. The project team includes scientists from academia, industry, and publishing.

IUPAC has approved the project with the intention of establishing precise base definitions of terms that will carry meaning for all academic and industrial chemists involved with this rapidly expanding technology. The materials embraced by the project range from inorganic porous gels and denser materials through organic/inorganic molecular hybrids and composites to certain types of organic network polymers. The processing of the materials can be from the liquid state using sol-gel methodologies or swelling/drying techniques, or from the solid state using the methods of blending and mixing. The different terms relating to both materials and the methods of processing that are in current use can be confusing to practitioners according to whether their background is rooted in polymer, inorganic, or applied chemistry. General terms concerned with classes of starting materials, intermediates and final product materials, their microstructures, the characteristic properties that relate to their processing, etc., will all be included.

The preparation of definitions is being coordinated by Profs. Richard Jones and Alan Chadwick, Titular Members of IUPAC's Commissions on Macromolecular Nomenclature (IV.I) and High-Temperature Materials and Solid State Chemistry (II.3), respectively, with participation from other members of both Commissions. Comments from the chemistry and polymer community are welcome and should be addressed to the project coordinator, Prof. Prof. Richard Jones, School of Physical Sciences, University of Kent, Canterbury, Kent CT2 7NR, England, United Kingdom; Tel.: +44 1227 823544; Fax: +44 1227 827558; E-mail: r.g.jones@ukc.ac.uk.

See http://www.iupac.org/divisions/current_projects/2000/000071_400_00.html for project description and update.

News and Notices from Other Societies and Unions

New www.royalsoc.ac.uk (The Royal Society)

This article originally appeared in the March 2000 issue of *The Royal Society News*, published by the Press and Public Relations Unit of the Royal Society (6 Carlton House Terrace, London SW1Y 5AG, England, UK), to whom we extend thanks for their permission to reproduce it in full.



On 26 January 2000, the Royal Society relaunched its web site (www.royalsoc.ac.uk), unveiling a new look with added features. This effort is part of the current drive to help the Society raise its profile and respond better to the needs of its increasingly diverse audiences.

Harnessing the help of the designers Synergy Communications, the aim of the redesign was to make the site more dynamic and user-friendly while taking advantage of developing web technologies and increased functionality.

The new site is now ordered with the end-user/audience in mind and offers full navigation between the various sections of the site via a navigation bar and link menus. Additional features of the new site include a dynamic home page with a changing “face of science” graphic, press release notices, and a daily update of science issues in the media; a registration system enabling users to receive e-mail updates of the Society’s activities; easy access to downloadable reports, media releases, and grant forms; and a secure, private area, solely for the use of Fellows—The Fellows’ Room. This area of the site is intended to provide information of specific interest to Fellows of the Royal Society and includes a Discussion Forum.

Future developments being planned include a searchable media directory of specialists, the transfer onto the site of some of the Society’s vast library and archive resources, and an education “subsite” aimed specifically at school children and teachers.

The web site will play an increasingly important part in the promotion of the Society and science in the future, and it is hoped that users will find the new site both informative and easy to use. We welcome any comments that you may have on the new look and structure of the web site. Please direct them to the Web Manager (webmanager@royalsoc.ac.uk).

Academies to Provide Science Advice to World Leaders

This article originally appeared in the March 2000 issue of *The Royal Society News*, published by the Press and Public Relations Unit of the Royal Society (6 Carlton House Terrace, London SW1Y 5AG, England, UK), to whom we extend thanks for their permission to reproduce it in full.

Eleven World Academies met in Davos, Switzerland in February 2000—a meeting convened to coincide with the World Economic Forum (WEF), which brings together top politicians, economists, business leaders, and opinion formers for an annual meeting to discuss global economic issues. The Academies discussed setting up a new organization to provide science advice to world leaders and to major intergovernmental agencies. The provisional title of the body is the InterAcademy Council (IAC). The Academies also took the opportunity to discuss with WEF participants key scientific issues likely to affect the world over the next decade, such as energy needs, information tech-



Presidents of science academies meet in Davos, Switzerland.

nology, ecosystems, disease, natural disasters, and science's contribution to rational decision making.

Those meeting agreed to pursue the idea of an InterAcademy Council, and four "wise men" were charged with preparing a draft constitution for the new Council. This document was discussed at the beginning of the "sustainability" meeting of national academies in Tokyo in May 2000.

The Tokyo conference's primary purpose was to

discuss global sustainability and to produce a statement agreed upon by over 50 academies on "transition to sustainability". It also provided an opportunity for the larger InterAcademy Panel (IAP) to discuss its own future. The Royal Society is expecting to continue to play a leading role in international science policy and remains actively involved in the discussions about the new Council and about the future direction of IAP.

Awards and Prizes

Ronald Breslow Elected to Royal Society

Prof. Ronald Breslow, Chemistry and University Professor at Columbia University in New York City and Titular Member of IUPAC's Organic and Biomolecular Chemistry Division (III) Committee as well as Member of the Subcommittee on Bioorganic Chemistry, has been elected as one of six new foreign members to the United Kingdom's prestigious Royal Society. Since its founding in 1660, the Royal Society has served as an independent academy promoting the natural and applied sciences. No more than 42 new fellows and 6 foreign members are elected annually for their contributions to science, both in fundamental research and through directing scientific and technological progress in industry and research establishments.

Prof. Breslow has been a leader in the field of bioorganic chemistry for more than 35 years, starting with his landmark paper that explained the mechanism of thiamine pyrophosphate as a catalyst, thereby leading to the concept of stabilized carbenes. He formulated the term "biomimetic chemistry" and developed many significant examples of reactions that simulate enzyme catalysis, such as the creation of an artificial enzyme in which two functional groups act synergistically to perform phosphate ester hydrolysis with high product selectivity. Prof.



Breslow also pioneered cyclodextrin chemistry, using that molecule as a cage in which selective chemistry with metals, coenzyme analogs, and aromatic substitution could be studied. He has also won the National Medal of Science and the 1999 Priestley Medal of the American Chemical Society.

New Books and Publications

New Books from IUPAC

Macromolecular Symposia, Vol. 146: Molecular Order and Mobility in Polymer Systems. Symposium Editor, Yu. Ya. Gotlib; Editor-in-Chief, Hartwig Hocker; Editors, W. Guth, B. Jung, I. Meisel, and S. Spiegel. Published by WILEY-

VCH, November 1999, pp. 1-273. ISBN 3-527-29906-8 (ISSN 1022-1360).

Volume 146 of *Macromolecular Symposia* contains the lectures presented at the 3rd International Symposium on Molecular Order and Mobility in Polymer Systems held 7-10 June 1999 in St. Petersburg, Russia (see symposium report by Prof. V. A. Kabanov published in *Chemistry International* in January

2000, Vol. 22, No. 1, pp. 17–18). That symposium continued the series of St. Petersburg meetings organized by the Institute of Macromolecular Compounds of the Russian Academy of Sciences (RAS), with the sponsorship of IUPAC and the support of the Russian Foundation of Basic Research and the St. Petersburg Research Center of RAS.

The 3rd Symposium (as well as the first one in 1994) was oriented more toward dynamic and relaxation phenomena, whereas the discussion at the 2nd Symposium (May 1996) focused mainly on problems of structure and order. Of course, these shifts in subject matter are never too dramatic; mobility in polymer physics and physical chemistry—just as in real life—is inseparable from the order (or disorder!) of the system.

The main topics of the 3rd Symposium included conformation and mobility of macromolecules in solutions, melts, and networks in strong external fields; structure and properties of liquid-crystalline polymers; block copolymers; polymer layers, brushes, and micelles; polymer complexes and membranes; and structure and dynamics of branched polymer systems, stars, dendrimers, and networks. All the systems considered share a common general feature: the order in them is “soft”, and there exists a pronounced molecular mobility.

The 3rd Symposium included 18 invited plenary lectures, 32 contributed lectures, and 180 poster presentations. This meeting was a truly international one; lectures and posters were submitted by scientists from Canada, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Israel, Japan, Kazakhstan, Lithuania, Netherlands, Portugal, Russia, Spain, Sweden, Turkey, United States, Uzbekistan, Ukraine, and the United Kingdom. A short account of the materials presented at the symposium was published in the book of abstracts. The plenary and contributed lectures were presented by eminent scientists at the pinnacle of their fields in polymer science (such as Sam Edwards, Tatiana Birstein, Victor Kabanov, etc.) and also by well-known active researchers of younger generations. The symposium featured a dynamic poster session that included presentations by many participants, especially young scientists, accompanied by very lively discussions.

Regrettably, this volume does not cover all the new and interesting results discussed at the symposium, because not all the authors were able to present their lectures for publication in it (some of the materials had been published earlier or submitted elsewhere). However, it provides a good representation of the scope of the meeting and of the main topics of the discussion.

Because of the close interconnection between the different topics, we preferred a less detailed classification of papers than that given in the original topics of the symposium. The classification accepted in this volume (“Mobility-Structure-Order” or “Structure-Order-Properties”) is still of a somewhat conditional character and is based on the most characteristic features of the investigation in a given paper.

Mobility-Structure-Order

The lectures devoted to polymer dynamics describe various types of relaxation phenomena on different time and length scales (from nanoscale to macroscopic) investigated by a broad variety of experimental, theoretical, and computer simulation methods. Polarized luminescence provides information on the molecular mobility in the nanosecond range that can be used to characterize molecular structure for copolymers of various chemical structure (Anufrieva et al.). An extensive set of methods (DSC, interferometric spectroscopy, TGA, dielectric relaxation spectroscopy, and thermally stimulated depolarization) were applied to study molecular dynamics in nanostructured polyimidesilicon materials (Bershtein et al.). Dybal and coworkers investigated the structure and mobility in polycarbonates and polycarbonate-PEO mixtures by NMR and vibrational spectroscopy. The relaxation of poly(4-oligodimethylsiloxanyl) styrene as seen by solid state ²⁹Si NMR was discussed by Kawakami in connection with the gas permeation behavior of the polymer membranes. Quasi-elastic neutron scattering, X-ray spectroscopy, and dielectric spectroscopy were applied to the investigation of the superstructure, order, and segmental dynamics of carbosilane dendrimers in bulk and solution (Stuehn et al.). Mechanical strength, ion conductivity, gas permeability, and ion exchange capacity were studied for new polymer membranes used for low-temperature fuel cells (Sundholm et al.). Rheo-optical FT-IR spectroscopy was used for investigating the intra- and intermolecular hydrogen bonding and its effect on the local mobility in solid poly(acrylic acid) films (Mavinkurve and Heyvelmans-Wijdenes). The mechanical and electrical degradation processes of polymer composites and the application of the Zhurkov thermofluctuation theory were studied by Mamedov et al.

Some papers were devoted to the theory and computer simulation of molecular mobility. The theoretical approach to the viscoelasticity of the polymer melt and cross-linked system as a function of frequency and cross-linking was developed by Edwards and Takano in the framework of a tube

model. The topology of the system and closing of the tube at cross-links were taken into account. The influence of the long-range hydrodynamic interactions between the polymer network and the effective viscous medium on the cooperative relaxation spectra was considered by Gotlib. Borodin and Khazanovich proposed a nonstandard alternative approach to hydrodynamic interactions in polymer solutions applied to the calculation of the diffusion coefficient and intrinsic viscosity of polymer solutions. An application of the mode-coupling theory to the dynamics of the DNA macromolecules and proteins and its effects on the NMR relaxation was treated by La-Penna and coworkers. Fatkullin and Kimmich considered the problems of intra- and interchain relaxation in entangled polymer melts using memory function formalism and also treated the visco-elastic properties of polymer melts with the help of renormalized Rouse formalism. Ngai presented an improved theory of the concentration dependence of the cooperative polymer dynamics in solutions based on the general coupling model explaining the stretched exponential time dependence of correlation functions and the same type of stretched exponential dependence of relaxation times on concentration. The conformational change and the kinetics of the coil-stretch transition in polymer chains in a steady elongational flow were investigated by computer simulation (de la Torre and Cifre). Oleinik and coworkers performed a detailed computer modeling of the local structure and rotational mobility of ethylene-olefin copolymers in *n*-paraffin crystals.

Thus, the theoretical work and computer simulations emphasize a detailed study of the collective motions in complex many-chain systems and the effects of strong external or internal fields (as in crystalline phases).

Structure-Order-Properties

The papers of this part of the symposium were devoted to the study of the interconnection between chemical constitution, morphology, and order for a broad class of macromolecular systems mentioned in the topics of the symposium. New types of mesophases (e.g., aperiodic layer mesophases) in rigid-chain copolymers and co-(poly)esteramides appearing in the two-phase semicrystalline materials were considered by Antipov, Plate, and Levchenko. Experimental electron microscopic structure investigations of organic molecules with nonlinear optical properties and *ab initio* quantum-mechanical structure determination were carried out by Voigt-Martin and coworkers. In the paper by Koyun et al., the effects of the molecular and super-

molecular structure of polyolefin on some mechanical properties of plastics used for manufacturing pipes were investigated. The structure of hydrophobically modified poly(ethylene oxide), association and ordering effects, formation of aggregates, and rheological behavior were considered by François et al. The interconnection between the polymer structure and optical properties (in IR and UV spectra) for polymer composite films was investigated by Boydag et al. Zaitsev and coworkers have studied the structure and properties of polymethylsiloxane monolayers with styrene and polystyrene-polysiloxane latexes and monolayer films. The group of papers was devoted to the properties of the neutral and charged hydrogels, their interaction with incorporated particles and surfactants (Starodoubtseva, Khokhlov et al.), the complexes between gels and organic dyes (Nasimova, Makhaeva, Khokhlov), and problems of the ion aggregation in hydrogels (Philippova, Khokhlov et al.).

Theory and computer simulation of the structure-order problem was also represented extensively in the symposium. The theory of mixed superstructures with different morphology formed in mixtures of ABC-triblock and AB-, AC-, and BC-diblock polymers was presented by Birshtein, Amoskov, and Polotskii. Johner, Vilgis, and Joanny considered the behavior of polyelectrolyte gels in poor solvent chains on the basis of single-chain elasticity, using the necklace model of polyelectrolytes. Paul, Weber, and Binder considered the competition between local LC-ordering and glassy-freezing in melts of semiflexible polymers using the MC computer simulation of the bond-fluctuation model. A simulation of a specific structurally ordered phase intermediate between the crystalline and amorphous phases was performed by Ludovice et al. Conformational structure and some dynamic characteristics of charged polyelectrolyte brushes (anchored chains) were studied by the molecular dynamics method of Seidel and Csaika. Lukasheva, Darinskii et al. studied (by the molecular mechanics method) the conformation of polyisocyanates with helical structure, and investigated the mechanisms of helix reversal and the comparative role of breaks and librations in the chain flexibility of PIC. The microstructure and collapse transition of protein-like AB-copolymer globules was investigated by computer simulation by Ivanov et al.

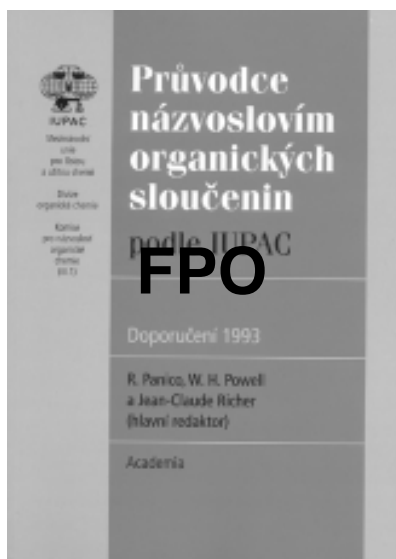
This brief review of the lectures of the symposium presented in this volume shows that the main interest in the investigation of the "structure-order-properties" problem lies in the domain of systems with complex chemical constitution and morphology such as polyelectrolytes, copolymers,

mesophases, glassy states with local ordering, etc.

We believe that this symposium contributed significantly to the understanding of the interconnection of mobility and order in polymer systems.

Prof. Yu. Ya. Gotlib

**Institute of Macromolecular Compounds
St. Petersburg, Russia**



Czech Edition of Blue Book: A Guide to IUPAC Nomenclature of Organic Compounds. Recommendations 1993. Originally prepared for publication by R. Panico, W. H. Powell, and Jean-Claude Richer (Senior Editor). Czech Edition: Průvodce názvoslovím organických sloučenin podle IUPAC. Doporučení 1993. Translation prepared by Jaroslav Kahovec, František Liška, and Oldřich Paleta. Softcover, 2000, pp. 1–220, ISBN 80-200-0724-5.

A Guide to IUPAC Nomenclature of Organic Compounds: Recommendations 1993 (the Blue Book), which was originally prepared for publication by R. Panico, W. H. Powell, and Jean-Claude Richer (Senior Editor), has been translated into Czech by Jaroslav Kahovec (a National Representative on IUPAC's Commission on Nomenclature of Organic Chemistry [III.1]), František Liška, and Oldřich Paleta.

The Czech edition, *Průvodce názvoslovím organických sloučenin podle IUPAC. Doporučení 1993* (ISBN 80-200-0724-5), has been published by Vydala Academia, nakladatelství Akademie věd České Republiky, Legerova 61, 120 00 Praha 2, Czech Republic.

Technical Reports and IUPAC Recommendations Published in 1999 Issues of *Pure and Applied Chemistry (PAC)* and Elsewhere

The Technical Reports and IUPAC Recommendations (asterisk [*] designates Recommendations) listed below have appeared in 1999 issues of *Pure and Applied Chemistry (PAC)* and elsewhere. They can be viewed on the IUPAC web site at <http://www.iupac.org/reports/1999/index.html>.

Physical Chemistry

- Interfaces against pollution - (I.6), *Colloids and Surfaces A* **151**, Nos. 1 and 2 (1999).
- Evaluated kinetic and photochemical data for atmospheric chemistry. Supplement VII (Organics) - (I.4), *J. Phys. Chem. Ref. Data* **28**, 191–393 (1999).
- Electrochemical biosensors: Recommended definitions and classification - (I.7, V.5), *Pure Appl. Chem.* **71**(12), 2333–2348 (1999).
- Pillared clays and pillared layered solids - (I.6), *Pure Appl. Chem.* **71**(12), 2367–2371 (1999).

Inorganic Chemistry

- Practitioner's report: International Measurement Evaluation Programme IMEP-7: Inorganic components in human serum - (II.4), *Accred. Qual. Assur.* **4**(11), 463–472 (1999).
- Definitions of terms for diffusion in the solid state* - (II.3), *Pure Appl. Chem.* **71**(7), 1307–1325 (1999).
- Nomenclature of organometallic compounds of the transition elements* - (II.2), *Pure Appl. Chem.* **71**(8), 1557–1585 (1999).
- Atomic weights of the elements 1997 - (II.1), *Pure Appl. Chem.* **71**(8), 1593–1607 (1999).
- Terminology for compounds in the Si-Al-O-N system* - (II.3), *Pure Appl. Chem.* **71**(9), 1765–1769 (1999).

Organic and Biomolecular Chemistry

- Bioorganic chemistry: A symposium in print - (III), *Bioorg. Chem.* **27**(1–2), (1999).
- Terminology, relative phototonic efficiencies, and quantum yields in heterogeneous photocatalysis. Part I: Suggested protocol - (III.3), *Pure Appl. Chem.* **71**(2), 303–320 (1999).
- Terminology, relative photonic efficiencies, and quantum yields in heterogeneous photocatalysis. Part II: Experimental determination of quantum yields - (III.3), *Pure Appl. Chem.* **71**(2), 321–335 (1999).
- Glossary of terms used in theoretical organic

- chemistry* - (III.2), *Pure Appl. Chem.* **71**(10), 1919–1981 (1999).
- Extension and revision of the von Baeyer system for naming polycyclic compounds (including bicyclic compounds)* - (III.1), *Pure Appl. Chem.* **71**(3), 513–529 (1999).
 - Extension and revision of the nomenclature for spiro compounds* - (III.1), *Pure Appl. Chem.* **71**(3), 531–558 (1999).
 - Revised Section F: Natural products and related compounds* - (III.1), *Pure Appl. Chem.* **71**(4), 587–643 (1999).
 - Critical compilation of scales of solvent parameters. Part I. Pure, non-hydrogen bond donor solvents - (III.2), *Pure Appl. Chem.* **71**(4), 645–718 (1999).
 - Corrections to *A Guide to IUPAC Nomenclature of Organic Compounds** - (III.1), *Pure Appl. Chem.* **71**(7), 1327–1330 (1999).
- ### Macromolecular Chemistry
- The use of diffusive sampling for monitoring of benzene, toluene, and xylene in ambient air - (IV.2), *Pure Appl. Chem.* **71**(10), 1993–2008 (1999).
 - Studies on biodegradable poly(hexano-6-lactone) fibers: 2. Environmental degradation - (IV.2), *Pure Appl. Chem.* **71**(11), 2177–2188 (1999).
 - The influence of reprocessing on the structure–property characteristics of a plasticized poly(vinyl chloride) (PVC-p) compound - (IV.2), *Pure Appl. Chem.* **71**(12), 2317–2332 (1999).
- ### Analytical Chemistry
- Harmonized guidelines for the use of recovery information in analytical measurement - (V), *Pure Appl. Chem.* **71**(2), 337–348 (1999).
 - Phosphorus speciation in water and sediments - (V.2), *Pure Appl. Chem.* **71**(11), 2161–2176 (1999).
 - Nomenclature, symbols, units, and their usage in spectrochemical analysis - XVII. Laser-based molecular spectrometry for chemical analysis: Absorption* - (V.4), *Pure Appl. Chem.* **71**(11), 2189–2204 (1999).
 - Analytical aspects of chemical process control: Part 1. Fundamentals - (V.1), *Pure Appl. Chem.* **71**(12), 2303–2308 (1999).
 - Temperature dependence of the Westcott g-factor for neutron reactions in activation analysis - (V.7), *Pure Appl. Chem.* **71**(12), 2309–2315 (1999).
 - Influence of pressure on chemical equilibria in aqueous systems - with particular reference to seawater - (V.6), *Pure Appl. Chem.* **71**(5), 871–890 (1999).
 - Terminology and convention for electrochemical stripping analysis - (V.5), *Pure Appl. Chem.* **71**(5), 891–897 (1999).
 - Species-selective analysis for metal-biomacromolecular complexes using hyphenated techniques - (V.2), *Pure Appl. Chem.* **71**(5), 899–918 (1999).
 - Classification and use of terms for amplification and related reactions * - (V.1), *Pure Appl. Chem.* **71**(7), 1331–1335 (1999).
 - Classification of scanning probe microscopies - (V.2), *Pure Appl. Chem.* **71**(7), 1337–1357 (1999).
 - A critical evaluation of the redox properties of uranium, neptunium and plutonium ions in acidic aqueous solutions - (V.5), *Pure Appl. Chem.* **71**(9), 771–1807 (1999).
- ### Chemistry and the Environment
- IUPAC collaborative trial study of a method to detect genetically modified soy beans and maize in dried powder - (VI.5), *J. AOAC Int.* **82**(4), 923–928 (1999).
 - Determination of mono- and diacylglycerols in edible oils and fats by high performance liquid chromatography and evaporative light scattering detector: Results of collaborative studies and the standardized method - (VI.6), *Pure Appl. Chem.* **71**(10), 1983–1991 (1999).
 - The determination of stigmastadienes in vegetable oils - (VI.6), *Pure Appl. Chem.* **71**(2), 349–359 (1999).
 - The determination of cadmium in oils and fats by direct graphite furnace atomic absorption spectrometry - (VI.6), *Pure Appl. Chem.* **71**(2), 361–368 (1999).
 - Reports on pesticides (41): Significance of the long range transport of pesticides in the atmosphere - (VI.4), *Pure Appl. Chem.* **71**(7), 1359–1383 (1999).
- ### Chemistry and Human Health
- Glossary of terms used in combinatorial chemistry - (VII.M), *Pure Appl. Chem.* **71**(12), 2349–2365 (1999).
- ### Other
- Guidelines for the use of the Internet by IUPAC bodies - (CPEP), *Pure Appl. Chem.* **71**(8), 1587–1591 (1999).
 - An extension to the JCAMP-DX standard file format* - (CPEP), *Pure Appl. Chem.* **71**(8), 1549–1556 (1999).
- *IUPAC Recommendations

Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry, Halogen Species: Supplement VIII. IUPAC Subcommittee on Gas Kinetic Data Evaluation for Atmospheric Chemistry, by R. Atkinson, D. L. Baulch, R. A. Cox, R. F. Hampson Jr., J. A. Kerr (Chairman), M. J. Rossi, and J. Troe. USD 55.00. Published in the *Journal of Physical and Chemical Reference Data*, Vol. 29, No. 2, pp. 167–266, 2000, by the American Chemical Society (1155 Sixteenth Street, N.W., Washington, DC 20036-9976) and the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology [S0047-2689(00)00302-0].

This paper updates and extends part of the previous database of critical evaluations of the kinetics and photochemistry of gas-phase chemical reactions of neutral species involved in atmospheric chemistry [*J. Phys. Chem. Ref. Data* **9**, 295 (1980); **11**, 327 (1982); **13**, 1259 (1984); **18**, 881 (1989); **21**, 1125 (1992); **26**, 521 (1997); **26**, 1329 (1997); **28**, 191 (1999)].

The present evaluation is limited to the inorganic halogen family of atmospherically important reactions. The work has been carried out by the authors under the auspices of the IUPAC Subcommittee on Gas Phase Kinetic Data Evaluation for Atmospheric Chemistry. Data sheets have been prepared for 102 thermal and photochemical reactions, containing summaries of the available experimental data with notes giving details of the experimental procedures.

For each thermal reaction, a preferred value of the rate coefficient at 298 K is given, together with a temperature dependence where possible. The selection of the preferred value is discussed, and estimates of the accuracies of the rate coefficients and temperature coefficients have been made for each reaction.

For each photochemical reaction, the data sheets list the preferred values of the photoabsorption cross sections and the quantum yields of the photochemical reactions, together with comments on how they were selected.

The data sheets are intended to provide the basic physical chemical data needed as input for calculations that model atmospheric chemistry. A table summarizing the preferred rate data is provided, together with an appendix listing the available values of enthalpies of formation of the reactant and product species.

Provisional Recommendations

IUPAC Seeks Your Comments

In this section, we publish synopses of IUPAC's latest provisional recommendations on nomenclature and symbols. All comments on these recommendations are welcome and will be taken into consideration. The final revised versions are published in *Pure and Applied Chemistry*.

If you would like to comment on the provisional recommendations, please visit the IUPAC web site at <http://www.iupac.org/reports/provisional/index.html>, where the full texts are available for downloading as draft pdf files. Alternatively, you can write to your nearest national/regional center to request a copy; the most recent list of national/regional centers is available on the web site at the address above and last appeared in *Chemistry International* **17**, 141 (1997).

Macromolecular Division. Commission on Macromolecular Nomenclature—Generic Source-Based Nomenclature for Polymers

<http://www.iupac.org/reports/provisional/abstract00/marechal_280201.html>

The commission has already published two documents on the source-based names of linear copolymers and nonlinear polymers; however, in some cases this nomenclature leads to ambiguous names. The present document proposes a generic source-based nomenclature that solves these problems and yields clearer source-based names. A generic source-based name comprises two parts:

1. a polymer class (generic) name followed by a colon; and
2. the actual or hypothetical monomer name(s), parenthesized in the case of a copolymer.

The formula, the structure-based name, the

source-based name, and the generic source-based name are given for each example in the document. In some cases, only generic source-based nomenclature gives unambiguous names—for example, when a polymer has more than one name or when it is obtained through a series of intermediate structures. The rules concern mostly polymers with one or more types of functional group or heterocyclic system in the main chain, but to some extent they are also applicable to polymers with side-groups, carbon-chain polymers such as vinyl or diene polymers, spiro and cyclic polymers, and networks.

Comments by 28 February 2001 to Prof. Ernest Maréchal, Laboratoire de Synthèse Macromoléculaire, Université Pierre et Marie Curie (Paris VI), Boîte 184 – Tour 54, 4e étage, 4 place Jussieu, F-75252 Paris Cédex 05, France; Tel.: +33 1 44 27 38 04; Fax: +33 1 44 27 70 54; E-mail: marechal@ccr.jussieu.fr.

Analytical Chemistry Division. Commission on Separation Methods in Analytical Chemistry—The Hold-Up Volume Concept in Column Chromatography

<http://www.iupac.org/reports/provisional/abstract00/jagd_280201.html>

Revised recommendations are presented for the nomenclature of the *hold-up volume* in chromatography, updating those originally presented in the IUPAC document “Nomenclature for Chromatography (IUPAC Recommendations 1993)”, *Pure and Applied Chemistry* **65**, 819–872 (1993). A number of related and derived definitions for retention parameters are described, including a definition of the term “chromatographic system”. The paper also

compares methods used in the literature to determine the hold-up volume.

Comments by 28 February 2001 to Prof. José Antonio García Domínguez, Institute of Physical Chemistry “Rocasolano”, Calle Serrano 119, E-28006 Madrid, Spain; Tel.: +34 91 561 9400; Fax: +34 91 564 2431; E-mail: jagd@iqfr.csic.es.

Analytical Chemistry Division. Commission on Separation Methods in Analytical Chemistry—Retention Parameters in Gas Chromatography

<http://www.iupac.org/reports/provisional/abstract00/davenkov_280201.html>

This paper presents a revision of terms in Chapter 3.6 The Mobile Phase and Chapter 3.7 Retention Parameters in Column Chromatography of the Nomenclature for Chromatography [“Nomenclature for Chromatography (IUPAC Recommendations 1993)”, *Pure and Applied Chemistry* **65**, 819–872 (1993)], with the aims of (i) emphasizing the physical meaning of the terms and (ii) specifying the temperatures and pressures for the terms for gas volumes and flow rates. A number of the original terms were found to be misleading or superfluous, including such terms as *corrected retention time*, *net retention time*, *total retention volume (time)*, *specific retention volume at 0 °C, relative pressure*; and their usage is strongly discouraged. Chapter 1.1 Basic Definitions was supplemented with the terms *chromatographic system* and *chromatographic process*.

Comments by 28 February 2001 to Prof. Vadim A. Davankov, Institute of Organo-Element Compounds, Russian Academy of Sciences, Vavilov Street 28, RU-117813 Moscow, Russia; Tel./Fax: +7 095 135 6471; E-mail: davank@ineos.ac.ru.

Reports from Commissions and Division Committees

Commission on Food—VI.5

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

Members Present: Chair, J. Gilbert; Secretary, S. Page; M. Miraglia; Titular Members: E. Anklam, J. MacNeil, M. Sabino; Associate Members: C. Brera, S. Dragacci, B. Szteke

Observers Present: J.-M. Fremy, P. Holland (Secretary, Chemistry and the Environment Division), M. Lauwaars (AOAC International), A. Pohland

(Chemistry and the Environment Division), R. Wood (Analytical Chemistry Division)

The meeting started in plenary session and then split into two parallel sessions covering Food Chemistry and Oils and Fats. This report covers the projects discussed within the Food Chemistry section.

Working Group Activities

- *Mycotoxins*: IUPAC Electronic Bulletin Board for Mycotoxins. Ongoing project, but with need to update regularly identified as a priority. Collaborative studies of the Determination of Aflatoxin

M₁ in Milk and Mycotoxin Methods for Developing Countries have been combined with an FAO/IAEA project. "Identification of major sources of ochratoxin A (OA) intake through the analysis of OA in human serum" has been published as a preliminary report (D. Palli et al. *Cancer Epidemiology, Biomarkers, and Prevention* **8**, 265–269, 1999).

- *Aquatic Biotoxins*: Unification of Aquatic Biotoxin Nomenclature. Project to be terminated, but a satellite meeting on this subject was proposed in conjunction with the 10th International Symposium on Mycotoxins and Phycotoxins (10th ISMP).
- *Halogenated Hydrocarbons and Environmental Contaminants*: A collaborative study on novel and conventional analytical techniques for the determination of toxicologically relevant PCB congeners in fish and human adipose tissues has been completed. A workshop to discuss novel extraction techniques, particularly for fish oils, was being planned for Barcelona, Spain, in the spring of 2000.
- *Elements*: Beryllium in Food. A critical assessment has been completed and published in *Food Additives and Contaminants* **17**, 149–159 (2000).
- *Natural Constituents*: Chemical Characterization of Garlic Preparations. Project to be terminated.
- *Animal Drugs*: Symposium on Issues in Regulatory Chemistry was held at the annual meeting of AOAC International in August 1997. The proceedings of this symposium, entitled "Current Issues in Regulatory Chemistry" and edited by Kay, MacNeil, and O'Rangers, have been published by AOAC International (Gaithersburg, Maryland, USA, 2000), ISBN 0-935584-66-8. This project is now complete.
- *Novel Foods*: A proposed symposium on genetically modified organisms was withdrawn. Validation of a screening method for the detection of genetically modified organisms (GMOs) in food has been completed and published in *J. AOAC Int.* **82**, 923–928 (1999).

Symposia/Workshops

- 10th International IUPAC Symposium on Mycotoxins and Phycotoxins (10th ISMP) was held in Guarujá, Brazil, 21–25 May 2000 (see report on page 140).
- Symposium on Trace Elements in Foods is being planned for Warsaw, Poland, 9–11 October 2000, with IUPAC sponsorship (see Conference Calendar on page 157).
- 2nd International Symposium on Food Packaging—Ensuring the Safety and Quality of Foods

is being organized by ILSI Europe with IUPAC sponsorship and will be held in Vienna, Austria, 8–10 November 2000 (see Conference Calendar on page 157).

Future Organization and Direction

- Task forces were proposed to be developed to manage clusters of projects to be continued after the Commission structure is abolished in 2002. The Food Chemistry Working Group accepted this proposal. A Natural Toxins Task Force (E. Anklam, Head) and a Chemical Contaminants and Residues Task Force (J. MacNeil, Head) were recommended.
- Following an informal meeting with the Commission on Toxicology (VII.C.2) of the Chemistry and Human Health Division, the Food Chemistry Working Group decided to participate in the CHHD ELEPHANT database project. This project (E. Anklam, Coordinator) is a compilation of baseline data for certain analytes in human tissues and fluids. This effort would be expanded to include analytes (such as contaminants) derived specifically from food sources.
- A. Pohland and S. Page suggested that a CHEMRAWN Conference on "Chemistry for Food Safety" be proposed to the CHEMRAWN Committee. A preproposal was presented informally to this Committee by S. Page. This preproposal was well received. In collaboration with IOCD, a formal proposal (S. Page, Coordinator) will be prepared.

Next Meeting

The next meeting of the Commission on Food (VI.5) will be in Warsaw, Poland, 7–8 October 2000, just before the Symposium on Trace Elements in Food.

John Gilbert

Chairman, IUPAC Commission on Food VI.5

Conference Announcements



designates IUPAC sponsorship.

International Symposium on Green Chemistry, 10–13 January 2001, Delhi, India



This symposium will address new products, processes, and services that attempt to achieve benefits from sustainable development. Such efforts require new approaches that reduce the material and energy intensity of chemical processes and products, minimize or eliminate dispersion of harmful chemicals in the environment, maximize use of renewable resources, and extend durability and recyclability of products in a way that increases industrial competitiveness.

Some of the challenges for chemists include discovering and developing new synthetic pathways using alternative feedstocks or more selective chemistry, identifying alternative reaction conditions and solvents for improved selectivity and energy minimization, and designing less toxic and inherently safer chemical products. The organizers of the symposium hope to foster the establishment of industry–government partnerships with universities and international laboratories to design and implement pollution prevention technologies other than waste management.

Scientific sessions will cover metal complexes for green earth chemistry, biocatalysis and its use in chemical synthesis, ecofriendly chemical technologies, greenhouse gases and their elimination, freshwater ecosystems, green catalysts and reagents for industrial applications, energy and environment, and air pollutants and their elimination. Approximately 500 scientific participants from around the world are expected to attend this symposium.

For further information, contact Dr. M. Kidwai, Department of Chemistry, University of Delhi, Delhi 110007, India; E-mail: mkidwai@mantraonline.com; Tel.: +91 11 725 6235; Fax: +91 11 725 6250.

4th Annual UNESCO School and South African IUPAC Conference on Macromolecules and Materials Science, 9–11 April 2001, Johannesburg, South Africa



The School and Conference have the following goals:

- to expose Africa to macromolecules and materials technology that is applicable to their economies,

- to create a virtual teaching encyclopedia CD-ROM for teaching in developing countries, where books, journals, and teaching material preparation are not available,
- to teach analytical skills during the preceding week at the UNESCO School Preconference Workshop, and
- to provide a worldwide forum for the gathering of many top-notch materials scientists.

Scientific sessions will cover the following topics principally from an industrial perspective:

- monomer synthesis and transformations
- catalysts and polymer synthesis (including combinatorial chemistry)
- polymer properties (chemical characterization, hyphenated HPLC techniques, morphology, and ultrasonics)
- stabilization and degradation
- polymerization (especially metallocenes and living-free radical)
- polymer processing, especially for polymer intermediates
- polyolefins and emulsions
- macromolecular and materials education
- advanced materials, nanostructured systems

A preconference workshop will be held 7–8 April 2001 in Johannesburg. Approximately 150 scientific participants from around the world are expected to attend these events.

For further information, contact Prof. R. D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials, Institute for Polymer Science, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa; E-mail: rds@maties.sun.ac.za; Tel.: +27 21 808 3172; Fax: +27 21 808 4967.

2nd International Workshop on Thermochemical, Thermodynamic, and Transport Properties of Halogenated Hydrocarbons and Mixtures, 9–11 April 2001, Paris, France

This workshop, organized under the auspices of IUPAC's Commission on Thermodynamics (I.2), is intended to increase knowledge and understanding of equilibrium and transport properties of halogenated hydrocarbons and related compounds, and

their mixtures with hydrocarbons and other compounds. The workshop will have four main themes, including:

- environmental constraints and regulation
- new products (in refrigeration, medicine, insulation, etc.)
- new measurements (physical property characterization)
- fundamentals (intermolecular potential calculations with O, F, and Cl as main heteroatoms of interest) and molecular simulations

The workshop, which will take place at École des Mines de Paris, will consist of plenary lectures, oral and poster presentations, and a poster discussion session, with publication of the Proceedings in *Fluid Phase Equilibria*. In addition, there will be a panel discussion to review progress and to recommend topics for theoretical and experimental studies for presentation at the final workshop to be held in 2002.

See http://www.iupac.org/divisions/current_projects/1998/121_18_98.html for further details about this workshop project.

For more information, contact Dr. Dominique Richon, CEREP-École des Mines de Paris, 35 rue Saint-Honoré, F-770305 Fontainebleau, France, E-mail: iupac_paris.wshop@cenerg.ensmp.fr; Tel.: +33 1 64 69 49 65; Fax: +33 1 64 69 49 68; Web site: http://www.cenerg.ensmp.fr/iupac_paris.wshop/workshop.html.

3rd International Symposium on Free-Radical Polymerization: Kinetics and Mechanisms, 3–8 June 2001, Il Ciocco, Lucca, Tuscany (Castelvechio Pascoli), Italy



This symposium aims at providing full coverage of the actual status of academic and industrial research into free-radical polymerizations. Subsections are planned on emulsion polymerization, controlled free-radical polymerization, polymerization in supercritical fluids, polymerization reaction engineering, and polymer characterization. Around 200 scientific participants from all over the world are expected to attend.

For additional information, contact Prof. Dr. M. Buback, Institute for Physical Chemistry, University of Göttingen, Tammannstrasse 6, 37077 Göttingen, Germany; E-mail: mbuback@gwdg.de; Tel.: +49 551 393141; Fax: +49 551 393144.

15th Bratislava International Conference on Polymers: Preparation of Nonconventional Polymer Dispersions, 25–28 June 2001, Smolenice, Slovak Republic



This microsposium is aimed at the study of the kinetics of free-radical polymerization of conventional and nonconventional monomers in micelles, monomer/polymer particles, and emulsified simple or multiple droplets. The theme has an impact on the preparation of tailored nanosized polymer and copolymer particles of various degrees of hydrophilicity/lipophilicity and on the preparation of polymer dispersions and polymer products with special properties. This meeting should stimulate further basic and applied research on the kinetics of free-radical polymerization. Approximately 70 scientific participants from around the world are expected to attend this microsposium.

For more information, contact Prof. Ignac Capek, Polymer Institute, Slovak Academy of Sciences, 842 36 Bratislava, Slovak Republic; E-mail: upolign@savba.sk; Tel.: +421 7 5477 2469; Fax: +421 7 5477 5923.

15th International Symposium on Plasma Chemistry (ISPC-15), 9–13 July 2001, Orléans, France



Plasmas are more and more deeply involved in many areas of science. The science and technology of these developments are closely connected. The extension of technologies from high-temperature arcs and torches to high- and low-pressure plasmas that are far from thermodynamic equilibrium now involves both chemical and physical engineering approaches.

Every two years, this symposium highlights progress in all areas of plasma chemistry. ISPC-15 will especially emphasize the growing importance of atmospheric pressure low-temperature plasmas and environmentally safe technologies, from the perspectives of basic science and applications. About 600 scientific participants from around the world are expected to attend ISPC-15.

For additional information, contact Dr. Jean-Michel Pouvesle, Laboratoire GREMI, Université d'Orléans, BP 6744, Orléans Cedex 2, France; E-mail: jean-michel.pouvesle@univ-orleans.fr; Tel.: +33 (0) 2 38 41 71 24; Fax: +33 (0) 2 38 41 71 54.

**4th International Symposium on
Ionic Polymerization,
22–26 October 2001, Crete, Greece**



Ionic polymerization (anionic and cationic) leads to polymeric materials with well-defined structure, microstructure, molecular weight, composition, and functionality. Recently developed polymerization techniques (such as living radical, template, and enzymatic) are compatible with a wide variety of monomers and less demanding than ionic polymerization. The combination of ionic polymerization with such new techniques can lead to materials with special properties.

This symposium will focus mainly on new developments in ionic polymerization, although several sessions will be dedicated to other polymerization techniques. Because in polymer science it is extremely important to control properties by means of macromolecular architecture, one session will be devoted to the physics of polymers resulting from the procedures mentioned above. Approximately 250 scientific participants from around the world are expected to attend this symposium.

For further information, contact Prof. Nikos Hadjichristidis, Department of Chemistry, University of Athens, Panepistimiopolis, Zografou, 157 71 Athens, Greece; E-mail: hadjichristidis@chem.uoa.gr; Tel.: +30 1 724 9103; Fax: +30 1 722 1800.

**7th International Symposium on
Hyphenated Techniques in
Chromatography and Hyphenated
Chromatographic Analyzers (HTC-7),
6–8 February 2002, Bruges, Belgium**



This symposium aims to give an overview of the fundamental aspects, instrumental developments, and applications of the various hyphenated chromatographic techniques (e.g., coupling of GC or LC to LC, GC, and SFE-SFC; MS, FTIR, AED, and other techniques coupled with GC, (HP)LC, SFC, CZE, and FFF; PTV-GC-MS; on-line air traps-, purge-and-trap, extractors-, and GPC-GC (or LC); LC to NMR, Raman, FIA-DAD, light-scattering; ITP-MS; and SPME- and MESI-techniques). Emphasis will be placed on sample preparation, sample introduction, miniaturization, microfabricated analytical devices; and the design of hyphenated, on-line, and at-line chromatographic analyzers.

Hyphenated chromatography is generally used in medicine and pharmacy, food and feed analysis, and in environmental and forensic studies. The recent outbreak of food poisoning by dioxins and PCBs

could only be solved using GC-MS techniques. This HTC symposium is the sole Congress in the world devoted to hyphenated chromatography. Around 400 scientific participants from all over the world are expected to attend.

For additional information, contact Robert Smits, Roelsstraat 20, B-8670 Oostduinkerke, Belgium; E-mail: smitsr@pophost.eunet.be; Tel./Fax: +32 58 514575.

**5th Annual UNESCO School
and South African IUPAC Conference on
Macromolecules and Materials Science,
6–10 February 2002,
Stellenbosch, South Africa**



The School and Conference have the following goals:

- to expose Africa to macromolecules and materials technology that is applicable to their economies,
- to create a virtual teaching encyclopedia CD-ROM for teaching in developing countries, where books, journals, and teaching material preparation are not available,
- to teach analytical skills during the preceding week at the UNESCO School Preconference Workshop, and
- to provide a worldwide forum for the gathering of many top-notch materials scientists.

Scientific sessions will cover an academic approach to developments in:

- monomer synthesis and transformations
- catalysts and polymer synthesis (including combinatorial chemistry)
- polymer properties (chemical characterization, hyphenated HPLC techniques, morphology, and ultrasonics)
- stabilization and degradation
- polymerization (especially metallocenes and living-free radical)
- polymer processing, especially for polymer intermediates
- polyolefins and emulsions
- macromolecular and materials education
- advanced materials, nanostructured systems

The School will include five parallel sessions on:

- thermal analytical techniques
- stabilization and recycling
- chromatographic techniques
- light microscopy of polymers
- nano analytical techniques, including SPM, TPM,

TMPM, NSOM, SEM, TEM, LALS, etc.

A preconference workshop will be held 30 January–3 February 2002 in Stellenbosch. Approximately 300 scientific participants from around the world are expected to attend these events.

For further information, contact Prof. R. D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials, Institute for Polymer Science, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa; E-mail: rds@maties.sun.ac.za; Tel.: +27 21 808 3172; Fax: +27 21 808 4967.

IUPAC World Polymer Congress 2002—39th International Symposium on Macromolecules, 7–12 July 2002, Beijing, China



The World Polymer Congress is the largest worldwide congress that covers all major fields of polymer science and technology. This Congress will provide an important opportunity for polymer scientists to present and exchange their new research results on chemistry, physics, and technology of polymers and application of macromolecular sciences to materials science. Especially at the beginning of the new century, this Congress will also emphasize subjects of universal concern, such as the future and challenge of polymer science, its mutual penetration with other science and technology areas, polymers and the environment, and the latest concepts and developments. About 1 000 scientific participants from around the world are expected to attend World Polymer Congress 2002.

For more information, contact Prof. Fosong Wang, Chinese Academy of Sciences, Beijing 100864, China; E-mail: fswang@mimi.cnc.ac.cn; Tel.: +86 10 62563060; Fax: +86 10 62573911.

14th International Conference on Organic Synthesis (ICOS-14), 14–19 July 2002, Christchurch, New Zealand



This biennial IUPAC-sponsored conference is one of the premier meetings on synthetic organic chemistry and is well attended by organic chemists from around the world. It has a reputation for attracting high-profile synthetic organic chemists as speakers. Because the conference has never been held in Australasia before, it is anticipated that the New Zealand site will enable more participants from the Southern Hemisphere to attend.

The conference organizers have made a commitment to hold symposia on some of the newer aspects of organic synthesis, such as combinatorial chemistry and green chemistry. Subsections are planned on robots in organic synthesis, combinatorial chemistry, green organic synthesis, new synthetic methods, stereoselective synthesis, metal-mediated synthesis, total synthesis of bioactive compounds, and synthesis of supramolecular systems. Approximately 500 scientific participants from around the world are expected to attend ICOS-14.

For further information, contact Prof. Margaret A. Brimble, Department of Chemistry, University of Auckland, 23 Symonds St., Auckland, New Zealand; E-mail: m.brimble@auckland.ac.nz; Tel.: +64 9 373 7599, Ext. 8259; Fax: +64 9 373 7422.

17th IUPAC Conference on Chemical Thermodynamics, 28 July–2 August 2002, Rostock, Germany



This meeting will bring together scientists who participate in thermodynamic research in order to discuss the most recent advances and to stimulate new lines of research. Traditional areas, such as thermodynamics of mixtures and solutions, phase equilibria, and thermochemistry, are still of worldwide importance. Decreasing research activity in these areas in the highly developed countries is partly compensated by the activity of an increasing number of researchers from underdeveloped countries and from East European countries. Therefore, these more traditional areas will play a major role in the list of topics covered by this conference.

On the other hand, chemical thermodynamics can make useful and necessary contributions to innovative and rapidly developing fields whose importance will increase dramatically within the next years and decades. The conference will address the thermodynamic aspects of the rapidly developing fields of biothermodynamics and biotechnology, new materials, membrane separation techniques and transport across membranes, and ionic liquids as a new class of solvent systems. Approximately 500 scientific participants from around the world are expected to attend this conference.

For additional information, contact Prof. Andreas Heintz, Universität Rostock, FB Chemie, 180512 Rostock, Germany; E-mail: andreas.heintz@chemie.uni-rostock.de; Tel.: +49 381 498 1852; Fax: +49 381 498 1854.



The theme of this Congress, “Innovative Solutions for Healthy Crops”, represents an open platform for presentation and discussion of state-of-the-art approaches in chemical synthesis, analytical sciences, discovery and selection tools, molecular biology, and

other scientific areas that are shaping the future of crop protection in sustainable agriculture.

For further information, contact Dr. Bernard Donzel, c/o Novartis CP AG, R-1060.3.06, CH-4002 Basel, Switzerland; E-mail: bernard.donzel@cp.novartis.com; Tel.: +41 61 697 2267; Fax: +41 61 697 7472; Web site: <http://www.cp.novartis.com/iupac2002/>.

Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

NEW designates a new conference since the last issue.

2000

Biotechnology

3–8 September 2000

11th International Biotechnology Symposium, Berlin, Germany.

Prof. G. Kreysa, DECHEMA e.V.— c/o 11th IBS, Theodor-Heuss-Allee 25, 60486 Frankfurt/Main, Germany.

Tel.: +49 69 7564 235 / -249

Fax: +49 69 7564 176 / -304

E-mail:

biotechnology2000@dechema.de

Nuclear and Radiochemistry

3–8 September 2000

5th International Conference on Nuclear and Radiochemistry (NRC5), Pontresina, Switzerland.

Prof. H. W. Gäggeler, Chairman, Mrs. R. Lorenzen, Secretary, Paul Scherrer Institut, CH-5232 Villigen-Ost, Switzerland.

Tel.: +41 56 310 2401

Fax: +41 56 310 4435

E-mail: ruth.lorenzen@psi.ch

Analytical Chemistry

3–9 September 2000

EUROANALYSIS XI, Lisboa, Portugal.

Prof. Maria Filomena Camões, Chair, Dr. Cristina Oliveira, Secretary, Departamento de Química e Bioquímica,

Faculdade de Ciências, Universidade de Lisboa, Edifício C1-5^o Piso, P-1700 Lisboa, Portugal.

Tel.: +351 1 3906138

Fax: +351 1 3909352; 7500088

E-mail: euroanalysisxi@fc.ul.pt

Natural Products

4–8 September 2000

22nd International Symposium on the Chemistry of Natural Products, São Carlos, São Paulo, Brazil.

Dr. M. Fátima das G.F. da Silva, Universidade Federal de São Carlos, Depto. de Química, Via Washington Luiz, km 235, CP676, São Carlos, São Paulo, Brazil.

Tel.: +55 16 260 8208

Fax: +55 16 260 8350

E-mail: dmfs@power.ufscar.br

Medicinal Chemistry

18–22 September 2000

XVI International Symposium on Medicinal Chemistry, Bologna, Italy.

Prof. C. Melchiorre, Università di Bologna, Dipartimento di Scienze Farmaceutiche, Via Belmeloro 6, I-40126 Bologna, Italy.

Tel.: +39 051 259 706

Fax: +39 051 259 734

E-mail: camelch@alma.unibo.it

Trace Elements in Food

9–11 October 2000

Warsaw, Poland.

Prof. B. Szeke, Chairman, Dr. R. Jedrzejczak, Secretary, Institute of Agricultural and Food Biotechnology ul. Rakowiecka 36

02-532 Warsaw, Poland.

Tel.: +48 22 606 3876

Fax: +48 22 4904 28

E-mail:

jedrzejczak@ibprs.waw.pl

Food Packaging

8–10 November 2000

2nd International Symposium on Food Packaging—Ensuring the Safety and Quality Food, Vienna, Austria.

Liên-Anh Tran, ILSI Europe, 83, Avenue E. Mounier, Box 6, B-1200, Brussels, Belgium.

Tel.: +32 (2) 771 0014

Fax: +32 (2) 762 0044

E-mail: anh@ilsieurope.be

Polymers

20–24 November 2000

7th Latin-American Symposium on Polymers (SLAP'2000) and 5th Ibero American Congress on Polymers, Havana, Cuba.

Dr. Ricardo Martínez, Dr. Waldo Argüelles-Monal, IMRE, Universidad de La Habana La Habana 10400, Cuba.

Fax: +53 7 33 42 47

E-mail: slap@imre.oc.uh.cu

Polymer Characterization

9–12 January 2001

9th International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.*Dr. Witold Brostow, Department of Materials Science, University of North Texas, Denton, Texas, 76203-5310 USA.**Tel.: +1 940 565 4358, -3262, or 4337**Fax: +1 940 565 4824**E-mail: brostow@unt.edu or polychar@marta.phys.unt.edu***Green Chemistry****NEW**

10–13 January 2001

International Symposium on Green Chemistry, Delhi, India.

*Dr. M. Kidwai, Organizing Convenor, Department of Chemistry, University of Delhi Delhi 110007, India**Tel.: +91 11 725 6235**Fax: +91 11 725 6250**E-mail:**mkidwai@mantraonline.com***Macromolecules****NEW**

9–11 April 2001

4th Annual UNESCO School and South African IUPAC Conference on Macromolecules and Materials Science, Johannesburg, South Africa.*Prof. R. D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials, Institute for Polymer Science, University of Stellenbosch, Private Bag XI, Matieland 7602, South Africa**Tel.: +27 21 808 3172**Fax: +27 21 808 4967**E-mail: rds@maties.sun.ac.za***Chemistry and Chemical Engineering**

16–20 April 2001

IV International Congress on Chemistry and XIII Caribbean Conference on Chemistry and

Chemical Engineering, Havana, Cuba.

*Prof. Alberto J. Núñez Sellés, Sociedad Cubana de Química, Ave 21&200, Atabey, Apdo. 16042, CP 11600, Havana, Cuba.**Tel.: +537 218 178**Fax: +537 336 471**E-mail: cqf@infomed.sld.cu***Free-Radical Polymerization**

3–8 June 2001

NEW3rd International Symposium on Free-radical Polymerization: Kinetics and Mechanism, Lucca, Italy.*Prof. M. Buback, Institute for Physical Chemistry, University of Göttingen, Tammannstr. 6, D-37077 Göttingen, Germany**Tel: +49 551 393141**Fax: +49 551 393144**E-mail: mbuback@gwdg.de***CHEMRAWN XIV**

9–13 June 2001

Chemrawn Conference—Toward Environmentally Benign Processes and Products, Boulder, Colorado, USA.

*Dr. Dennis L. Hjeresen, Environmental Management Program, Los Alamos National Laboratory - Mail Stop J591, Los Alamos, NM 87545.**Tel.: +1 505 665 7251**Fax: +1 505 665 8118**E-mail: dennish@lanl.gov***Polymer Dispersions****NEW**

25–28 June 2001

15th International Conference on Polymers: Preparation of Non-Conventional Polymer Dispersions, Smolenice, Slovak Republic.*Prof. Ignac Capek, Polymer Institute, Slovak Academy of Sciences, SR-842-36 Bratislava, Slovak Republic**Tel.: +421 7 5477 2469**Fax: +421 7 5477 5923**E-mail: upolign@savba.sk***IUPAC 41st General Assembly**

29 June–8 July 2001

Brisbane, Australia.

*IUPAC Secretariat.**Tel.: +1 919 485 8700**Fax: +1 919 485 8706**E-mail: secretariat@iupac.org***IUPAC 38th Congress/World Chemistry Congress 2001**

1–6 July 2001

Brisbane, Australia.

*Congress Secretariat, P.O. Box 177, Red Hill Q 4054, Australia.**Tel.: +61 7 3368 2644**Fax: +61 7 3369 3731**E-mail: wcc2001@ccm.com.au***Coordination and Organometallic Chemistry of Germanium, Tin, and Lead**

8–12 July 2001

10th International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin, and Lead, Talence, France.*Dr. B. Jousseume, Laboratoire de Chimie Organique et Organometallique, UMR 5802, Université Bordeaux I, 351 avenue de la Libération, F-33405 Talence Cedex, France.**Tel.: +33 (0) 5 56 84 64 43**Fax: +33 (0) 5 59 84 69 94**E-mail: b.jousseume@lcoo.u-bordeaux.fr***Scattering Methods and Polymers**

9–12 July 2001

20th Discussion Conference on Scattering Methods for the Investigation of Polymers, Prague, Czech Republic.*Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nam. 2, CZ-162 06 Praha 6, Czech Republic.**Tel.: +420 2 204 0332**Fax: +420 2 367 981**E-mail: sympo@imc.cas.cz*

Plasma Chemistry

NEW

9–13 July 2001

15th International Symposium on Plasma Chemistry (ISPC-15), Orléans, France.

Prof. Jean-Michel Pouvesle, Laboratoire GREMI, Université d'Orléans, BP 6744, Orléans Cedex 2, France

Tel.: +33 (0) 2 38417124

Fax: +33 (0) 2 38417154

E-mail: jean-michel.pouvesle@univ-orleans.fr

Polymer Membranes

16–19 July 2001

41st Microsymposium on Polymer Membranes, Prague, Czech Republic.

Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nam. 2, CZ-162 06 Praha 6, Czech Republic.

Tel.: +420 2 204 03332

Fax: +420 2 367 981

E-mail: sympo@imc.cas.cz

Organometallic Chemistry

22–26 July 2001

11th IUPAC International Symposium on Organometallic Chemistry Directed

Towards Organic Synthesis

(OMCOS 11), Tapei, Taiwan.

Prof. Tien-Yau Luh, Department of Chemistry, National Taiwan University, Tapei 106, Taiwan.

Tel.: +886 2 23636288

Fax: +886 2 23644971

E-mail: tyluh@ccms.ntu.edu.tw

Phosphorus Chemistry

29 July–3 August 2001

15th International Conference on Phosphorus Chemistry, Sendai, Japan.

Prof. Masaaki Yoshifuji, Department of Chemistry, Graduate School of Science, Tohoku University, Aoba, Sendai 980-8578, Japan.

Tel.: +81 22 217 6558

Fax: +81 22 217 6562

E-mail:

yoshiffj@mail.cc.tohoku.ac.jp

Analytical Sciences

6–10 August 2001

International Congress on Analytical Sciences 2001 (ICAS2001), Tokyo, Japan.

Prof. Tsuguo Sawada, Chairman, Department of Applied Chemistry, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan.

Tel.: +81 3 5841 7236 (or 7237)

Fax: +81 3 5841 6037

E-mail: icas2001@laser.t.u-tokyo.ac.jp

Solution Chemistry

NEW

26–31 August 2001

27th International Conference on Solution Chemistry (27ICSC), Vaals, Netherlands.

Dr. Christian Dux, Conference Secretary of 27th ICSC, Institute of Physical Chemistry, RWTH-Aachen, D-52062, Aachen, Germany

Tel.: +49 241 80 4752 or +49 241 80 4712

Fax: +49 241 8888 327 or +49 241 8888 128

E-mail: 27icsc@liquid.pc.rwth-aachen.de

Ionic Polymerization

NEW

22–26 October 2001

4th International Symposium on Ionic Polymerization, Crete, Greece.

Dr. Nikos Hadjichristidis, University of Athens, Department of Chemistry,

Panepistimiopolis, Zografou, GR-157 71 Athens, Greece

Tel.: +30 1 724 9103

Fax: +30 1 722 1800

E-mail:

hadjichristidis@chem.uoa.gr

Biodiversity

3–8 November 2001

3rd IUPAC International Conference on Biodiversity (ICOB-3), Antalya, Turkey.

How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsorship, conference organizers should complete an Advance Information Questionnaire (AIQ). The AIQ form is available at <http://www.iupac.org> or by request at the IUPAC Secretariat, and should be returned between 2 years and 12 months before the conference. Further information on granting sponsorship is included in the AIQ and available online.

Prof. B. Sener, Department of Pharmacognosy, Faculty of Pharmacy, Gazi University, P.O. Box 143 06572, Maltepe-Ankara, Turkey.

Tel.: +90 312 212 2267

Fax: +90 312 213 3921

E-mail: blgsener@tr-net.net.tr

Sweeteners

13–17 November 2001

2nd International Symposium on Sweeteners, Hiroshima-Shi, Japan.

Prof. Kasuo Yamasaki, Institute of Pharmaceutical Sciences, Faculty of Medicine, Hiroshima University Kasumi, Minami-ku, Hiroshima 734-8551, Japan.

Tel.: +81 82 257 5285

Fax: +81 82 257 5289

E-mail:

yamasaki@pharm.hiroshima-u.ac.jp

2002

Polymer Characterization

7–11 January 2002

10th International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.

Dr. Witold Brostow, Department of Materials Science, University of North Texas, Denton, Texas, 76203-5310 USA

Tel.: +1 940 565 4358, -3262,
or 4337
Fax: +1 940 565 4824
E-mail: brostow@unt.edu or
polychar@marta.phys.unt.edu

Chromatography

NEW

6–8 February 2002
7th International Symposium on
Hyphenated Techniques in
Chromatography and Hyphen-
ated Chromatographic Analyz-
ers (HTC-7), Bruges, Belgium.
Robert Smits, Roelsstraat 20, B-
8670 Oostduinkerke, Belgium
Tel./Fax: +32 58 514575
E-mail:
smitsr@pophost.eunet.be

Macromolecules

NEW

6–10 February 2002
5th Annual UNESCO School and
South African IUPAC Confer-
ence on Macromolecules and
Materials Science, Stellenbosch,
South Africa.
Prof. R. D. Sanderson, UNESCO
Associated Centre for Macro-
molecules and Materials,
Institute for Polymer Science,
University of Stellenbosch,
Private Bag XI, Matieland
7602, South Africa
Tel.: +27 21 808 3172
Fax: +27 21 808 4967
E-mail: rds@maties.sun.ac.za

Bioorganic Chemistry

12–15 May 2002
6th International Symposium on
Bioorganic Chemistry (ISBOC-
6), Toronto, Canada.
Dr. Ronald Kluger, Department
of Chemistry, University of
Toronto, Toronto, Canada M5S
3H6.
Tel.: +1 416 978 3582
Fax.: +1 416 978 3482
E-mail:
rkluger@chem.utoronto.ca

Macromolecules

NEW

7–12 July 2002
39th International Symposium
on Macromolecules - IUPAC

World Polymer Congress 2002
(MACRO 2002), Beijing, China.
Prof. Fosong Wang, The Chinese
Academy of Sciences, Beijing
100864, China
Tel: +86 10 62563060
Fax: +86 10 62573911
E-mail: fswang@mimi.cnc.ac.cn

Organic Synthesis

NEW

14–19 July 2002
14th International Conference on
Organic Synthesis (ICOS-14),
Christchurch, New Zealand.
Prof. Margaret A. Brimble,
Department of Chemistry,
University of Auckland, 23
Symonds St., Auckland, New
Zealand
Tel.: +64 9 373 7599, Ext. 8259
Fax: +64 9 373 7422
E-mail:
m.brimble@auckland.ac.nz

Chemical Thermodynamics

NEW

28 July–2 August 2002
17th IUPAC Conference on
Chemical Thermodynamics,
Rostock, Germany.
Prof. A. Heintz, FB Chemie,
Universitat Rostock,
Hermannstr. 14, D-18051
Rostock, Germany
Tel.: +49 381 498 1852
Fax: +49 381 498 1854
E-mail:
andreas.heintz@chemie.uni-
rostock.de

Crop Protection

NEW

4–9 August 2002
10th IUPAC International
Congress on the Chemistry of
Crop Protection (formerly
International Congress of
Pesticide Chemistry), Basel,
Switzerland.
Dr. Bernard Donzel, c/o
Novartis CP AG, WRO-
1060.3.06, CH-4002 Basel,
Switzerland
Tel.: +41 61 697 22 67
Fax : +41 61 697 74 72
E-mail:
bernard.donzel@cp.novartis.com

Visas

It is a condition of spon-
sorship that organizers of
meetings under the aus-
pices of IUPAC, in consid-
ering the locations of such
meetings, should take all
possible steps to ensure the
freedom of all bona fide
chemists from throughout
the world to attend irre-
spective of race, religion,
or political philosophy.
IUPAC sponsorship implies
that entry visas will be
granted to all bona fide
chemists provided applica-
tion is made not less than
three months in advance. If
a visa is not granted one
month before the meeting,
the IUPAC Secretariat
should be notified without
delay by the applicant.

Polymer Science and Technology

2–5 December 2002
IUPAC Polymer Conference on
the Mission and Challenges of
Polymer Science and Technol-
ogy, Kyoto, Japan.
Prof. Seiichi Nakahama, Faculty
of Engineering, Tokyo Institute
of Technology, 2-12-1
Ohokayama, Meguro-ku, Tokyo
152-8552, Japan.
Tel.: +81 3 5734 2138
Fax.: +81 3 5734 2887
E-mail:
snakaham@polymer.titech.ac.jp

Chemistry International

2000, Vol. 22, No. 6 (November)



- 161 News from IUPAC
- 161 IUPAC Celebrates 80 Years of Service to Chemistry with Commemorative Periodic Table
- 172 In Memoriam: Kurt L. Loening (1924–2000)
- 174 New Projects
- 174 News and Notices from Other Societies and Unions
- 175 New Books and Publications
- 178 Awards and Prizes
- 178 Provisional Recommendations
- 179 Reports from Commissions and Division Committees
- 181 Conference Announcements
- 185 Conference Calendar
- 189 Index

ISSN 0193-6484

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

THE INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

80 Years of Service to Chemistry



TIME OF DISCOVERY

Before 1800 1800-1899 1900-1999 2000-2000

Elements 112 and above have been reported but not yet fully authenticated and named



2000, Vol. 22, No. 6 (November)

Chemistry International

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

PUBLICATIONS MANAGER: Alan J. Senzel
PRODUCTION EDITOR: Cheryl Wurzbacher

All correspondence to be addressed to The Editor, *Chemistry International* (CI), IUPAC Secretariat, P. O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Telephone: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: edit.ci@iupac.org and <http://www.iupac.org/publications/ci/>

Subscriptions

Six issues of *Chemistry International* (ISSN 0193-6484) will be published bimonthly in 2000 (one volume per annum) in January, March, May, July, September, and November. The 2000 subscription rate is USD 99.00 for organizations and USD 45.00 for individuals. Subscription orders may be placed directly with the IUPAC Secretariat. Affiliate Members receive CI as part of their Membership subscription, and Members of IUPAC bodies receive CI free of charge.

Reproduction of Articles

Unless there is a footnote to the contrary, reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original in *Chemistry International*.

Periodicals postage paid at Durham, NC 27709-9998 and additional mailing offices. POSTMASTER: Send address changes to *Chemistry International*, IUPAC Secretariat, P.O. Box 13757, Research Triangle Park, NC 27709-3757.

Front cover: Commemorative periodic table to celebrate IUPAC's 80 years of service to chemistry. See article on page 161.

Printed by: Cadmus Professional Communications, Easton, MD, USA

International Union of Pure and Applied Chemistry

International Union of Pure and Applied Chemistry (IUPAC)



President: A. HAYES (UK)
Vice President: P. S. STEYN (South Africa)
Past President: J. JORTNER (Israel)

Secretary General: E. D. BECKER (USA)
Treasurer: C. F. BUXTORF (Switzerland)

IUPAC Secretariat

P.O. Box 13757, Research Triangle Park, NC 27709-3757, USA. Tel.: +1 (919) 485 8700. Fax: +1 (919) 485 8706. E-mail: secretariat@iupac.org and <http://www.iupac.org>

The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary non-governmental, nonprofit association of organizations, each of which represents the chemists of a member country. Its objectives are as follows:

- to promote continuing cooperation among the chemists of the member countries
- to study topics of international importance to pure and applied chemistry which need standardization or codification
- to cooperate with other international organizations that deal with topics of a chemical nature
- to contribute to the advancement and understanding of pure and applied chemistry in all its aspects

The membership of IUPAC currently comprises 45 national organizations.

National Adhering Organizations

Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Österreichische Akademie der Wissenschaften (**Austria**)
Nationaal Comité voor Scheikunde/Comité National de Chimie (**Belgium**)
Brazilian Chemistry Committee for IUPAC (**Brazil**)
Bulgarian Academy of Sciences (**Bulgaria**)
National Research Council of Canada (**Canada**)
Sociedad Chilena de Química (**Chile**)
Chinese Chemical Society, Beijing (**China**)
Chemical Society located in Taipei (**China**)
Croatian Chemical Society (**Croatia**)
Czech National Committee for Chemistry (**Czech Republic**)
Det Kongelige Danske Videnskabernes Selskab (**Denmark**)
Academy of Scientific Research and Technology (**Egypt**)
Suomen Kemian Seura (**Finland**)
Comité National Français de la Chimie (**France**)
Deutscher Zentrallausschuss für Chemie (**Germany**)
Association of Greek Chemists (**Greece**)
Hungarian Academy of Sciences (**Hungary**)
Indian National Science Academy (**India**)
Royal Irish Academy (**Ireland**)
Israel Academy of Sciences and Humanities (**Israel**)

Consiglio Nazionale delle Ricerche (**Italy**)
Science Council of Japan (**Japan**)
Korean Chemical Society (**Korea**)
Kuwait Chemical Society (**Kuwait**)
Koninklijke Nederlandse Chemische Vereniging (**Netherlands**)
Royal Society of New Zealand (**New Zealand**)
Norsk Kjemisk Selskap (**Norway**)
Chemical Society of Pakistan (**Pakistan**)
Polska Akademia Nauk (**Poland**)
Sociedade Portuguesa de Química (**Portugal**)
Colegio de Químicos de Puerto Rico (**Puerto Rico**)
Russian Academy of Sciences (**Russia**)
King Abdulaziz City for Science and Technology (**Saudi Arabia**)
Slovak Chemical Society (**Slovakia**)
Slovenian Chemical Society (**Slovenia**)
National Research Foundation (**South Africa**)
Oficina de Ciencia y Tecnología (**Spain**)
Svenska Nationalkommittén för Kemi (**Sweden**)
Neue Schweizerische Chemische Gesellschaft (**Switzerland**)
Türkiye Kimya Derneği (**Turkey**)
Royal Society of Chemistry (**United Kingdom**)
National Research Council, National Academy of Sciences (**USA**)
Union of Yugoslav Chemical Societies (**Yugoslavia**)

News from IUPAC

IUPAC Celebrates 80 Years of Service to Chemistry with Commemorative Periodic Table

Prof. Herbert D. Kaesz (Department of Chemistry and Biochemistry, University of California at Los Angeles, Los Angeles, California 90095-1569, USA; E-mail: hdk@chem.ucla.edu), Chairman of the IUPAC Commission on Nomenclature of Inorganic Chemistry (II.2), has submitted the following brief text to accompany the commemorative periodic table inserted in the mailing with this issue of *Chemistry International* (see also cover illustration). The material below has been excerpted from a paper currently in preparation by Prof.

W. H. Koppenol (a former Titular Member and Secretary of Commission II.2) on the procedures for naming new elements, and it incorporates suggestions offered by Prof. John Corish (President of IUPAC's Inorganic Chemistry Division II) and Dr. Gerd M. Rosenblatt (Vice President of Division II).

The right to name a new element has traditionally been accorded by the scientific community to the discoverer(s) after claims have been established beyond a doubt. Since 1947, names suggested by discoverers have been reviewed for suitability by the IUPAC Commission on Nomenclature of Inorganic Chemistry (II.2), and the accepted name has been forwarded for approval to the IUPAC Council. To avoid confusion, discoverers

are asked to use an atomic number rather than a name in the literature until approval of a proposed name is received from IUPAC. If a particular name has been used unofficially for a given element but a different name is ultimately chosen, the first name *cannot* be transferred at a later time to designate a different element.

The most recent process of review and approval of the names for elements 101–109 (IUPAC Recommendations 1997) appeared in *Pure and Applied Chemistry*, Vol. 69, No. 12, pp. 2471–2473 (1997), and a summary was published in *Chemistry International*, Vol. 20, No. 2, pp. 37–38 (1998). Because claims of the synthesis of heavy elements can be controversial, a joint Working Party of the International Unions of Pure and Applied Chemistry (IUPAC) and Physics (IUPAP) has been established to review published details and assign priority in the discovery. This procedure was applied to elements 101–109, and it is now in force for elements 110 and beyond. A more complete report on the procedures for naming new elements is in now preparation for submittal to *Pure and Applied Chemistry*.

THE INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

80 Years of Service to Chemistry

Elements 110 and above have been reported (but not yet fully substantiated) and named

TIME OF DISCOVERY: 1869, 1913, 1925, 1927, 1947, 1948, 1952, 1955, 1961, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999

Symbol	Name	Symbol	Name	Symbol	Name
Ac	Actinium	Gd	Gadolinium	Pm	Promethium
Ag	Silver (Argentum)	Hf	Hafnium	Pu	Plutonium
Al	Aluminium, aluminum	Hg	Hydrogen	Rf	Rutherfordium
Am	Americium	He	Helium	Rg	Rutherfordium
As	Arsenic	Ho	Holmium	Sg	Seaborgium
Au	Gold (Aurum)	Ir	Iridium	Si	Silicon
Ba	Barium	Lu	Lutetium	Sm	Samarium
B	Boron	Os	Osmium	Ta	Tantalum
Be	Beryllium	P	Phosphorus	Tb	Terbium
Bi	Bismuth	Re	Rhenium	Ti	Titanium
Br	Bromine	Rn	Radon	U	Uranium
C	Carbon	S	Sulfur	V	Vanadium
Ca	Calcium	Se	Selenium	W	Tungsten (Wolfram)
Cd	Cadmium	Sn	Stannum	Xe	Xenon
Ce	Cerium	Sr	Strontium	Y	Yttrium
Cf	Californium	Ta	Tantalum	Zn	Zinc
Cl	Chlorine	Tb	Terbium		
Cm	Curium	Ti	Titanium		
Cs	Cesium, cesium	U	Uranium		
Cu	Copper (Cuprum)	V	Vanadium		
Dy	Dysprosium	W	Tungsten (Wolfram)		
Eu	Europium	Xe	Xenon		
F	Fluorine	Y	Yttrium		
Fe	Iron (Ferrum)	Zn	Zinc		
Fr	Francium				
Ge	Germanium				

Report on First Workshop on Thermochemical, Thermodynamic, and Transport Properties of Halogenated Hydrocarbons and Mixtures, Pisa, Italy, 15–18 December 1999

Dr. John H. Dymond (Department of Chemistry, University of Glasgow, University Avenue, Glasgow, Scotland G12 8QQ, UK; E-mail: johnd@chem.gla.ac.uk), Secretary of the IUPAC Commission on Thermodynamics (I.2), has submitted the following report:

The objective of this IUPAC project is to increase knowledge and understanding of the thermodynamic and transport properties of halogenated organic compounds—especially halogenated aliphatic hydrocarbons—and of their mixtures, and also of their mixtures with hydrocarbons.

The aims of this first workshop, held under the auspices of the IUPAC Commission on Thermodynamics (I.2) were as follows:

- to review the available experimental data for these systems (density, speed of sound, vapor pressure, viscosity, thermal conductivity, etc., with the addition of phase equilibria and excess properties for mixtures) in order to identify areas for further study;
- to consider available methods for thermodynamic modeling, including EOS for pure fluids and mixtures, innovative mixing rules, model inter-comparisons, computer simulations, and model approaches for the transport properties; and
- to select key systems and topics for collaborative research to be carried out for presentation and discussion of the results at future workshops.

There were eight invited lectures. In the opening lecture, Prof. J. Gmehling (University of Oldenburg, Germany) reviewed the data situation by reference to the information stored in the Dortmund Data Bank, and pointed out data gaps and limitations in the temperature range of the data. He also gave results of selected predictive methods for certain properties. Dr. A. Laesecke (NIST, Boulder, CO, USA) pointed out the serious discrepancies that existed between different sets of viscosity data reported in the literature for refrigerants and alternative refrigerants, and showed how they arose from failure to apply the correct working equation for the viscometer. He discussed the metrology advances at NIST in viscosity and thermal conductivity measurement and reported results on binary and ternary fluorocarbon mixtures. Prof. M. J. Assael (Aristotle University, Thessaloniki, Greece) suggested R135a as a calibrant fluid for such measurements. He reported the temperature and pressure dependence of recent transport property measurements on methane-,

ethane-, and propane-derived halogenated refrigerants and described a hard-sphere-based scheme for their correlation. Prof. K. Watanabe (Keio University, Yokohama, Japan) gave an overview of state-of-the-art thermodynamic property measurement and thermodynamic property modeling of halogenated hydrocarbon refrigerants, with reference to technically important HFCs and their mixtures and also fluorinated ethers. Dr. J. H. Dymond (University of Glasgow) concentrated on second virial coefficients of halocarbons and the transport properties of the liquids at saturation pressure, pointing out data needs and the degree of success of data correlation with current methods. Dr. S. B. Kiselev (Colorado School of Mines, Golden, CO, USA) described a new crossover approach for the prediction of thermodynamic and transport properties of pure fluids and binary mixtures in and beyond the critical region. Dr. M. Quintel (University Hospital, Mannheim, Germany) described the use of perfluorocarbons as artificial oxygen carriers and in liquid ventilation, pointing out that future possible use of these compounds depended on detailed knowledge of their properties. Prof. J. A. Glasysz (Universität Erlangen-Nürnberg, Germany) illustrated the importance of fluorine compounds in biphasic catalysis, and showed the need for physical property data for the optimum design of these compounds.

Dr. H. V. Kehiaian (University of Paris 7) reported on the IUCODIX Project for the transfer of standardized electronic numerical data files from data generators to data users. The aim of this project is to build on the work of the IUPAC-CODATA Task Group to improve the accessibility of numerical data. This effort will result in the design and use of standard data formats for the presentation and exchange of numerical data.

There were 30 oral communications and a poster discussion session for the 30 poster presentations. The workshop closed with a round-table discussion to consider the priorities for further research. Details can be found at http://www.iupac.org/divisions/current_projects/1998/121_18_98.html.

The proceedings of this workshop will be published as a special issue of *Fluid Phase Equilibria*.

This highly successful workshop, which attracted 90 participants, was excellently organized by Prof. E. Matteoli (Pisa) and his Scientific and Local Organizing Committees. The next workshop, to be organized by Prof. Dominique Richon (École Nationale Supérieure des Mines de Paris), is planned for March/April 2001.

Report on the 2000 Annual Meeting of the Consultative Committee for Amount of Substance (CCQM), International Bureau of Weights and Measures (BIPM) Headquarters, 4–7 April 2000, Sèvres, France

Dr. Aleš Fajgelj (Quality Assurance Supervisor, International Atomic Energy Agency Laboratories, A-2444 Seibersdorf, Austria; E-mail: A.Fajgelj@iaea.org), Chairman of the IUPAC Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories, has submitted the report published below. Please note that all statements contained therein reflect only the author's opinion; at the time of the report's preparation, no official minutes had been issued by CCQM (BIPM).

As the IUPAC representative, I attended the 2000 annual meeting of the Consultative Committee on Amount of Substance (CCQM) at the BIPM Headquarters in Sèvres, France, 4–7 April 2000. Items discussed included the mutual recognition arrangement, structure of the information database on CCQM key-comparisons, reports from working groups, and biometrology. The most important part of the meeting was a symposium on "Primary Methods of Analysis". CCQM is the highest metrological body involved with metrology in chemistry; within its authority, the following methods have so far been identified as potentially primary: gravimetry, coulometry, titrimetry, and isotope dilution mass spectrometry.

It has been recognized for some time that a method *per se* is not enough to deliver results expected for primary methods—that is, results with the smallest possible measurement uncertainty and direct traceability to basic units of the International System of Units (SI). A combination of matrix, analyte, method, and analyst defines what level of traceability and uncertainty can be achieved in practice. In this sense, it was the aim of the symposium to investigate the following analytical methods with respect to their potential for being primary methods of analysis:

- coulometry for determining purity
- differential scanning calorimetry for determining purity
- integrated instrumental methods for determining purity
- titrimetric determination of copper in an elemental solution
- gravimetric determination of sodium in serum
- ID-GC/MS for clinical diagnostic markers
- ID-ICP-MS for trace elements in natural waters
- INAA for arsenic in semiconductor materials

- ICP-OES for major elements in a high-temperature alloy
- cavity ring down spectroscopy for gas purity measurements
- absolute isotopic ratio measurements for determining amount of substance

A required scope for all presentations encompassed underlying principle(s) of methodology, basis for being primary method (in principle and in practice), critical review of best practices, scope of applicability (limits and boundary conditions), and example(s) with quantified measurement uncertainty.

No instant conclusion emerged at the meeting to declare one or more of the methods as having primary characteristics. Apparently, the very high quality of most of the presentations and examples was somewhat overwhelming to the Committee. For this reason, it is unlikely that additional methods will soon be added to the list of primary methods, although it was recognized that some of the methods presented might produce results of the highest metrological quality. A popular opinion at the CCQM after the presentations was that, rather than declaring methods as being primary, one should see if the methods applied and the results obtained (i.e., traceability and measurement uncertainty) are really "fit for purpose". Therefore, a traditional distinction between "primary" and "other" methods of analysis does not play as important a role as the use of validated methods that are "fit for their intended use".

By definition, primary methods are being applied in production of primary reference materials. For this reason, the above-mentioned change in the perception of analytical methods has a very strong influence on the characterization and certification of reference materials. This change was immediately reflected at the meeting of the ISO Committee on Reference Materials (ISO REMCO, held in Geneva, Switzerland, 15–17 May 2000; see report on page 167), specifically in the preparation of a new ISO Guide 35, "Certification of Reference Materials—General and Statistical Principles".

Report on the 32nd Codex Committee on Pesticide Residues (CCPR) Meeting, 1–5 May 2000, The Hague, Netherlands

Dr. Kenneth D. Racke (Dow AgroSciences, 9330 Zionsville Road, Building 308/2B, Indianapolis, Indiana 46033, USA; E-mail: kracke@dowagro.com), Chairman of IUPAC's Commission on Agrochemicals and the Environment (VI.4), has contributed the following report in his capacity as head of the IUPAC delegation to the 32nd CCPR Meeting:

General

This meeting included approximately 55 national and 15 observer delegations (including IUPAC). The Codex MRL-setting process is a slow one, and the current meeting provided evidence that this will continue to be the case for the foreseeable future. CCPR is active both in recommending new maximum residue limits (MRLs) and in reviewing existing MRLs via a periodic review program. For a third consecutive year, the meeting was attended by a small but quite vocal activist group, Consumers International (CI). This group made many comments related to the sensitivity of children, the need for conservative approaches for dietary risk assessment, and the need for cumulative exposure assessment of pesticides with a common mechanism of toxicity. A large observer delegation also attended on behalf of industry (Global Crop Protection Federation), which distributed a series of position papers on several topics of interest.

Chronic Dietary Assessment and Risk Management Options

The CCPR continues to use calculations of the theoretical maximum daily intake (TMDI, based on MRL intake) and international estimated daily intake (IEDI, based on supervised trial median residues, SMTRs) against the acceptable daily intake (ADI) to determine the acceptability of newly proposed or reevaluated MRLs. This methodology was refined and supported by the recently concluded IUPAC project, "Optimum use of available residue data in the estimation of dietary intake of pesticide residues" (*Pure Appl. Chem.* **69**, 1373–1410, 1997).

Some controversy had arisen at the last CCPR Meeting as to what risk management steps are available when the IEDI is exceeded. Australia had prepared a discussion paper titled "Proposed Measures When Dietary Exposure Estimates Exceed the ADI". Current practice is to withhold final approval of MRLs pending production of additional data to allow a more refined assessment and/or withdrawal of one or more uses by the manufacturer. The option is whether instead to proceed with approval of MRLs in such instances but, recognizing the conservative nature of the IEDI calculation, flag such Codex limits (CXLs) as candidates for further assessment by national regulatory authorities. After spirited discussion, the Committee agreed to maintain the current practice but, by circular letter also obtain from national authorities their views on such practices and options that the CCPR should consider in the future. Some other potential options identified in the discussion paper included use of monitoring data for intake assessment refinement, consideration of percentage of crop treated, and reliance by CCPR on more sophisticated national dietary intake assessments. Australia agreed to summarize inputs from national authorities and bring these forward at the 2001 CCPR Meeting. [CX/PR 00/7]

Acute Dietary Assessment and Risk Management Options

A topic of much interest once again at the CCPR Meeting was acute dietary risk assessment. Having reached agreement on the basic methodologies for the international estimate of short-term dietary intake (IESTI) through a couple of past consultations and an ad hoc expert meeting before the 1999 CCPR Meeting, the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) had been directed to begin implementation of such calculations for adults and children for acutely toxic pesticides. Although the JMPR has been setting acute reference dose (ARfD) when it felt necessary during the past several years, the 1999 JMPR was the first to employ and report such IEDI calculations (see 1999 JMPR Report, Appendix IV). For each commodity for which an MRL is proposed or already exists, a single-tier assessment is available, which is based on maximum residues observed in field trials multiplied by an uncertainty factor; there is no level of refinement available short of generating new field residue data. One change suggested by the JMPR and endorsed by CCPR was to employ a variability factor of 7 instead of 10 for medium-sized commodities.

The CCPR chair, Wim van Eck, had prepared a discussion paper titled "Acute Dietary Risk Assessment of Pesticide Residues and Risk Management Options" to summarize his proposal for how the IESTI calculations would be used by CCPR in setting and reviewing MRLs. Basically, if the IESTI for a given commodity exceeds the ARfD and further refinement through generation of new data will not result in an acceptable calculation, the proposed MRL will not be advanced. It was understood that this same approach would be used also with existing CXLs for acutely toxic pesticides. The CCPR endorsed such an approach on an interim basis, but also agreed to continue to seek refined approaches to acute dietary intake assessment and also to solicit national authority comments on their approaches to acute dietary intake assessment. This refinement should be greatly assisted by the ongoing IUPAC project on "Acute Dietary Intake Assessment".

Several delegations expressed concern over the highly conservative nature of the current approach. For example, the Netherlands indicated that some comparison of probabilistic acute dietary calculations at the 99.99 percentile with the IESTI employed by CCPR revealed the latter of these approaches to be more conservative. It was anticipated that at some point in the future, an expert consultation on refined approaches to acute dietary assessment will likely be held, and this matter was tabled for discussion until the 2001 CCPR Meeting. [CX/PR 00/3]

Development of Databases for Acute Exposure Assessment

Dr. Jerry Moy shared "Progress Report on the Development of Databases for Acute Exposure Assessment". The CCPR-endorsed methodology for the IESTI calculation employs 97.5 percentile body weights for adults and children and also 97.5 percentile consumption data (eaters only) for each commodity of interest for acute intake assessment. Because consumption data had only been provided by six countries (Australia, Japan, United States, France, Netherlands, and United Kingdom), it has not been possible to construct regional diets, as is the case for chronic dietary assessment. Instead, the highest 97.5 percentile consumption among each of these six countries has been chosen so as to create a single database of global "super-eaters". [CX/PR 00/3-Add.1]

Sensitivity of Infants and Children

Significant discussion occurred related to the issue of the potentially greater sensitivity of infants and children than adults to pesticides. Based on a request from last year's CCPR Meeting, the 1999 JMPR had reviewed this issue and concluded in its report: "The routine use of safety factors in addition to those currently used is not justified on the basis of current information". JMPR/WHO Joint Secretary John Herrman indicated that JMPR evaluates all the relevant data for each pesticide, including studies on developmental toxicity, and makes a case-by-case determination based on the most sensitive endpoints for establishment of no observed effect levels (NOELs) and ADIs. A room document circulated by Consumers International castigated the JMPR for its inability to reach the same answer as the U.S. National Academy of Sciences had several years ago, and pressed for an expert consultation of pediatric specialists to provide guidance on the issue. The delegations of Germany and France made statements regarding their concerns also for proper protection of infants, although the former had a more sweeping concern and the latter had a narrower concern (i.e., perhaps only ten or so pesticides really are of high concern). After some discussion (see also section below on MRLs for baby food), the CCPR agreed to support the JMPR position, but encouraged the JMPR to consider with each individual chemical review the specific evidence available that would indicate greater sensitivity of the young. In addition, a circular letter from CCPR to national governments will request information on the nature and rationale for their concerns related to infant and child sensitivity to pesticides, including a listing of specific pesticides already identified as being of national concern. The 2001 CCPR Meeting would then consider further the option of an expert consultation on child sensitivity to pesticides. [CRD 16]

Establishment of Special MRLs for Cereal-Based Baby Food

At the last meeting of the CCPR, the German delegation had been asked to prepare a paper dealing with pesticide considerations and baby foods, and a document introduced for review by the 2000 CCPR was titled "Feasibility of Establishing Specific MRLs for Cereal-Based Foods and Infant Formula". The paper was strongly focused on age-related differences in susceptibility to pesticides and contained a set of ten recommendations that included development of additional data requirements (e.g., developmental neurotoxicity), adoption of a very low common limit for residues of pesticides in processed cereal-based foods for infants and children and infant formula, and consideration of whether to require new residue testing data for processed children's foods or to set separate child-MRLs for the raw agricultural components of these foods.

Although the common very low limit proposal was supported by the EC Delegation, several delegations (e.g., Australia, Canada, and the United States) expressed strong reservations about the approaches outlined in the German paper or the real need for any special approach on cereal foods and infant formula. At the end of the discussion, the CCPR concluded that 1) at present, CXLs were not being set for composite foods, 2) such an approach would require new methodology so complicated as to be infeasible, 3) some delegations questioned the need for such an approach, 4) consensus could not be reached on setting a low MRL for baby food or child-MRLs for raw commodities, and endorsed the ALINORM 99/26 statement that if the presence of pesticides in such baby foods is technically unavoidable, they are to be reduced to the maximum extent possible. [CX/PR 00/9]

FAO Specifications: Future Link with JMPR Reviews

Some discussion occurred related to the proposal of the 1999 JMPR report to schedule only those pesticides for a first or periodic review for which FAO specifications have been established. JMPR recognized that it might take some time before this recommendation is fully implemented. Several concerns related to this proposal were raised, including whether it was reasonable to expect specifications to be set for new pesticides (i.e., still under patent and not subject to generic manufacture) before Codex MRL establishment. The CCPR, however, supported the recommendation of JMPR in linking the Codex MRL and FAO specification processes, and directed the informal Working Group on Priorities to explore ways of aligning the JMPR future schedule with that of the FAO specification process.

Establishing MRLs to Accommodate Genetically Modified Organism (GMO) Crops

A short discussion paper on establishing MRLs to accommodate genetically modified organism (GMO) crops was advanced by Canada for discussion. The primary focus was on herbicide-tolerance GMO crops, which may have either an altered balance of metabolite versus parent or new metabolites as compared with non-GMO crops. The paper concluded that an MRL for a given commodity must accommodate both traditional and GMO crops, but that it is not possible to establish separate MRLs for GMO crops, owing to analytical difficulties. A number of delegates supported this approach, but a few (e.g., Germany) seemed interested in establishing separate residue definitions in some cases where new metabolites occurred in the GMO. Based on discussion, it was agreed to issue a circular letter to national authorities as to how they currently deal with residue definition and enforcement monitoring for GMO crops. A summary of responses will be collected by Canada and advanced at the 2001 CCPR Meeting for further discussion. [CX/PR 00/8]

Proposal for a Baker's Dozen of New Regional Diets

A proposal to replace the 5 existing world diets used for chronic dietary assessment with 13 regional "consumption cluster" diets was again advanced in a report from WHO. A statistical method was employed to group countries into the 13 units. The proposal would require compilation of an extensive dietary survey of a number of the clusters for which inadequate consumption data are currently available. There was general concern from the Committee about the proliferation of regional diets and complication of the dietary assessment process. Questions arose as to whether the 5 existing diets might not already be adequate and whether an increase to 9 regional diets might be more reasonable. In addition, several delegations expressed concern that proliferation of the number of world diets would potentially increase the likelihood that the TMDI or IEDI would exceed the ADI for at least one region, thereby blocking future progress in advancing MRLs. The present European diet, which most often is that of the region with a calculated ADI exceedence, was used as an example; it would be split into 5 separate clusters with the new system. Based on these concerns, WHO agreed to prepare a revised proposal for the 2001 CCPR Meeting and also to bring forward some example chronic intake calculations for the 5 vs. 13 dietary region approaches. [CX/PR/00/4]

Harmonization of MRLs for Crop Pesticides and Animal Drugs

A discussion paper on harmonization of MRL-setting for compounds used both as pesticides and veterinary

drugs was advanced by WHO. At present, the CCPR establishes animal product MRLs for plant pesticides and external veterinary products (e.g., sheep dips and cattle sprays), whereas the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF) develops MRLs for internal veterinary products. At times, different residue definitions and MRLs for the same commodities and pesticides have been established by each committee. Harmonization of some animal commodity definitions has already occurred, but CCPR refused to rename "meat" per the CCRVDF term "muscle". The Committee agreed to seek fuller cooperation with CCRVDF, and also directed JMPR to seek liaison with the CCRVDF-equivalent Joint Expert Committee on Food Additives (JECFA) earlier in the evaluation process for chemicals of joint interest, but harmonization in the Codex world clearly has a long road ahead. [CX/PR 00/6]

Pesticide Residue Problems in Developing Countries

The ad hoc working group on problems related to pesticide residues in food in developing countries considered two papers. South Africa brought forward a discussion document that highlighted issues related to import residue problems of tropical and minor crops, which often lack CXLs as well as national MRLs in importing countries. The best option at present appears to be for developing countries, as well as bilateral partnerships such as COLEACP (Europe-Africa-Caribbean-Pacific Liaison Committee for the Promotion of Tropical Fruits and Off-Season Vegetables), to generate and submit residue trial data to JMPR and/or national governments to establish MRLs. India brought forward a discussion document that focused on the need for MRLs or extraneous maximum residue limits (EMRLs) for spices, which frequently are found to contain violative residues of existing or banned pesticides (e.g., DDT), presumably owing to spray drift, environmental contamination, or possible unauthorized use. Although field residue trials data are required to set MRLs for spices, monitoring data are required instead for setting EMRLs for environmental contaminants. India agreed to serve as data collection coordinator for spice residue information to be brought forward to JMPR in the future. [CX/PR 00/14] [CX/PR 00/14-Add.1]

Priority List for Future JMPR Evaluations

The listing of new pesticides and older ones for periodic review was updated during the meeting and presented as a discussion document. [CX/PR 00/13-Add.1]

New chemicals for review during upcoming JMPR sessions are as listed below:

- 2000: chlorpropham, fipronil
- 2001: imidacloprid, spinosad
- 2002: esfenvalerate, flutolanil

- 2003: acibenzolar-S-methyl, quinclorac
- 2004: famoxadone, alpha-cypermethrin, zeta-cypermethrin

Compounds for which manufacturer support for periodic review was withdrawn included chlorfenvinphos, permethrin, flucythrinate, and vamidothion.

The updated listing of tentative JMPR agendas should be available soon at: <http://www.fao.org/waicent/FaoInfo/Agricult/AGP/AGPP/Pesticid>.

Report on the 23rd Committee on Reference Materials (REMCO) Meeting of the International Organization for Standardization (ISO), ISO Headquarters, 15–17 May 2000, Geneva, Switzerland

Dr. Aleš Fajgelj (Quality Assurance Supervisor, International Atomic Energy Agency Laboratories, A-2444 Seibersdorf, Austria; E-mail: A.Fajgelj@iaea.org), Chairman of the IUPAC Interdivisional Working Party on Harmonization of Quality Assurance Schemes for Analytical Laboratories, has submitted the report published below. Please note that all resolutions contained therein were still undergoing final approval at press time. The resolutions are listed only by topic, and the accompanying text reflects only the author's opinion.

The Committee on Reference Materials (REMCO) of the International Organization for Standardization (ISO) was established in 1975. The aim of the committee is to carry out and encourage a broad international effort for the harmonization and promotion of certified reference materials, their production, and applications. The specific objectives of ISO REMCO are as follows:

- to establish definitions, categories, levels, and classifications of reference materials for use by ISO
- to determine the structure of related forms of reference materials
- to formulate criteria for choosing sources for mention in ISO documents (including legal aspects)
- to prepare guidelines for technical committees to use when citing reference materials in ISO documents
- to propose, as far as necessary, action to be taken on reference materials required for ISO work
- to deal with matters within the competence of the Committee—in cooperation with other organizations—and to advise the Technical Board on action to be taken

ISO REMCO has so far been structured into six task groups, which include Hierarchy, Calibration, Promotion, Accreditation, Sampling, and Transportation and Distribution of Reference Materials.

There is a traditionally strong cooperation between ISO REMCO and IUPAC—especially with IUPAC's Interdivisional Working Party for Harmonization of Quality Assurance Schemes for Analytical Laboratories. As a successor to Dr. Arthur Head in the position of IUPAC–ISO REMCO liaison person, I attended the ISO REMCO 2000 Annual Meeting. This 23rd ISO REMCO Meeting took place 15–17 May 2000 at ISO Headquarters in Geneva, Switzerland. Conclusions of this meeting are described in 20 resolutions, the most important of which are listed below:

- **Business Plan/Strategic Review of REMCO:** ISO REMCO should be the highest body dealing with technical and “political” issues related to certified reference materials (i.e., classification, regulation, certification principles, preparation of guides, etc). In recent years, other organizations have also entered this field, for example, EURACHEM and the International Laboratory Accreditation Cooperation (ILAC; Secretariat in Sydney, Australia). This fragmentation has resulted in some discrepancies in guidance documents issued by various organizations and duplication of work. To improve the situation, a strategic plan was prepared and introduced to the members.
- **New Organizational Structure of REMCO:** The number of Task Groups was reduced from six to three, and Task Groups have been renamed as the following Subcommittees: 1) International Coordination and Harmonization, 2) Technical Guidance, and 3) Classification and Education. Seven new Working Groups (WGs) were formed, including: 1) Revision of ISO Guide 35, 2) Inclusion of Guide to the Expression of Uncertainty in Measurement (GUM) in ISO Guides, 3) Categories of Certified Reference Materials (CRMs), 4) Transportation, 5) Pharmacopoeia, 6) Information Booklets, and 7) Revision of International Vocabulary of Basic and General Terms in Metrology (VIM). I was nominated chairman of the WG on categorization of Reference Materials (RMs).
- **Publication of ISO Guide 31 and ISO Guide 33:** *Contents of Certificates of Reference Materials* (ISO Guide 31) and *Uses of Certified Reference Materials* (ISO Guide 33) were accepted and will be published within a few months. Final versions can be obtained from the ISO Central Secretariat. Unfortunately, because publication of both these guides was delayed for almost two years, new revisions, needed to bring them into accord with the latest version of ISO Guide 34 and a new ISO Guide 35, will be required soon.
- **Publication of ISO Guide 34:** *Quality System Requirements for Reference Materials Producers* (ISO Guide 34) was just published. Although it was origi-

nally planned that there would be only one such document, ILAC has published a similar guide (ILAC Guide 12). Thus, a difference in classification of reference materials exists and should be resolved between ISO and ILAC.

- **Consistency between ISO Guides and GUM:** The ISO Guide *Expression of Uncertainty in Measurement* (Geneva, 1995) has, in the last few years, influenced almost all fields of analytical chemistry. The requirement of ISO Standard 17025 that analytical results need to be reported together with their associated measurement uncertainty also strongly underpins ISO REMCO's new *Certification of Reference Materials—General and Statistical Principles* (ISO Guide 35). This viewpoint is understandable, because RMs are often applied in field laboratories for quantification of combined uncertainty or separate sources of measurement uncertainty. At the moment, revision of ISO Guide 35 is around 50% complete. Its publication is not to be expected before summer 2001. ISO Guide 35 is also a basis for future classification of RMs. However, the principles of the new guide are clear, and they will, to a certain extent, influence all reference materials producers dealing with matrix RMs. Principles of ISO Guide 35 include the following:

1. Characterization of the candidate material through large international laboratory comparisons, which normally results in a consensus value, is no longer regarded as appropriate. Comparison of results from a small number of laboratories is preferred; however, all participants must demonstrate traceability of their results and report their measurement uncertainty.
2. When a number of laboratories participate, as described at the beginning of paragraph 1, the results should be treated in the same way as if they were produced by a single laboratory. Statistics applied in combining these results and their uncertainties does not break a traceability chain when each laboratory separately reports traceable results. At the same time, a small number of participants can better communicate to clarify eventual discrepancies, and the entire certification project can be processed faster. Exclusion of outliers on the basis of statistics alone is not allowed. Unfortunately, in large worldwide inter-comparisons, it is almost impossible to control and to achieve these requirements.
3. In preparing the revised ISO Guide 35, no distinction will be made between "primary" methods of measurement and "other" methods. There is a common requirement that methods applied for CRM characterization are "fit for purpose" and that measurement uncertainty is as small as

reasonably achievable. These decisions were based partially on the latest developments at the Consultative Committee on Amount of Substance (CCQM) at BIPM, Sevres, France (see report on page 163). CCQM has recognized that methods of analysis cannot be declared as traceable as methods *per se*. Rather, a combination of analyte, measurand, matrix, and technique is important. For various analytical techniques, the ability to produce results that are "fit for purpose" has already been demonstrated, although not declared as "primary".

- **Similarities and Differences between Materials Used in Measurement Processes:** Several different types of materials are used in measurement processes (e.g., CRMs, RMs, proficiency-testing materials, internal quality control samples, calibration standards, etc.). A clear distinction between them, based on the quality requirements for these materials and their intended use, has to be made. The first draft of a paper on this topic was expected by the end of this year. As the topic also concerns chemical terminology, strong cooperation with IUPAC is foreseen. The result of IUPAC Project 501/9/97, "Compilation and clarification of quality assurance-related nomenclature" and Alphabetical Index of Defined Terms and Where They Can Be Found, prepared by Mr. David Holcombe and published in three parts in *Accreditation and Quality Assurance* [see *Accred. Qual. Assur.* **4**, No. 12, pp. 525–530 (1999); **5**, No. 2, pp. 77–82 (2000); and **5**, No. 4, pp. 159–164 (2000)] will serve as a starting point. For a summary of the project and links to the abstracts of the *Accred. Qual. Assur.* articles, please visit the IUPAC web site at www.iupac.org/divisions/current_projects/1997/501_9_97.html.

The next two ISO REMCO Meetings are planned to take place at the National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, USA, 21–23 May 2001 in conjunction with the 100th anniversary of NIST; and in Ljubljana, Slovenia in May 2002, respectively.

Overview of the International Symposium on Atmospheric Deposition and its Impact on Ecosystems, with Reference to the Mideast Region, Tel Aviv, Israel, 4–5 June 2000

Prof. René E. Van Grieken (Departement Scheikunde, Universitaire Instelling Antwerpen, Universiteitsplein 1, B-2610 Antwerpen [Wilrijk], Belgium; E-mail: vgrieken@uia.ua.ac.be), a National Representative on

IUPAC's Chemistry and the Environment Division's Commission on Atmospheric Chemistry (VI.2), and Dr. Yehuda Shevah (TAHAL Consulting Eng., Ltd., 54 Ibn Gvirol Street, POB 11170, Tel Aviv 61111, Israel; E-mail: tahalcmp@netvision.net.il), Chairman of IUPAC's Commission on Soil and Water Chemistry (VI.3), have submitted the following report:

Introduction

Atmospheric supplies of nitrogen and phosphorus, heavy metals, polychlorinated biphenyls (PCBs), chlorinated pesticides, and other persistent organic pollutants (POPs) may play a major role in ecosystem dynamics, particularly in oligotrophic marine areas such as the Southeast Mediterranean, in terrestrial ecosystems, and in inland freshwater bodies. The interface between the atmosphere and the sea plays a central role in the exchange of matter. Trace elements, such as lead, cadmium, and mercury, enter the sea to a considerable extent via the atmospheric pathway. Over 50% of the nitrogen input to the North Sea may be supplied by the atmosphere, with most of this amount being derived from anthropogenic sources. In estuaries and seas, extra nutrients can cause eutrophication, with enhanced growth of algae populations, and subsequent oxygen deficiency when the dead algae material decomposes.

Hundreds of lakes and streams can no longer sustain life, while the threat to forests and watersheds in many parts of the world is growing. In Israel, the freshwater Sea of Galilee—providing 35% of the water supply—is now showing a very unstable quality. It is likely that the dustfall, which can amount to 60% of the total solid input into the lake, may exert a profound influence on the properties and behavior of the lake in general and on the water quality in particular. In the Dead Sea area, ozone depletion was reported to coincide with an interaction of atmospheric oxidants with bromide at the Dead Sea salt pans.

In view of the growing threat of atmospheric deposition and the increasing need to expand our knowledge in the field, an International Symposium on Atmospheric Deposition and Its Impact on Ecosystems was convened 4–5 June 2000 in Tel Aviv, Israel. The symposium, organized by IUPAC's Division of Environmental Chemistry and by the Israel Chemical Society, brought together about 70 internationally recognized experts from the United States, Europe, the Mediterranean Region, and Israel.

Symposium Issues

- Atmospheric processes related to the Mideast Region as a zone in which air mass trajectories can trace both local pollution and the influence of Europe and the Sahara as sources.
- Effects of the large efforts that have been made to

reduce or control emissions to air of SO₂ and NO_x, volatile organic compounds (VOCs), and, more recently, of metals and POPs.

- Cycling of pollutants between the atmosphere and the ecosystem compartments and new developments in experimental techniques for flux measurements.
- Review of atmospheric deposition studies covering the work of the Cooperative Program for Monitoring and Evaluation of Long-Range Transmission of Air Pollutants in Europe (EMEP), the EUREKA Project on the Transport and Chemical Transformation of Environmentally Relevant Trace Constituents in the Troposphere over Europe (EUROTRAC), ASE, the Biosphere Atmosphere Exchange of Trace Gases and Aerosols (BIATEX), and interaction with regional and local studies in the Middle East.

Topics of Discussion and Main Sessions

- backward trajectories of air masses over the Mediterranean
- effects of atmospheric pollutants on the Southeast Mediterranean Region
- Saharan dust
- impact on ecosystems
- research cooperation

Wet and Dry Atmospheric Deposition

Atmospheric removal occurs by dry deposition of aerosol particles and gases, or by wet deposition in rain, fog, hail, and snow. The relative importance of these two processes varies between locations and is primarily a function of the rainfall intensity. For example, at the Northern and Western European temperate latitudes, wet deposition amounts to about half of the total atmospheric input of nitrogen to natural ecosystems.

The processes of dry deposition were described by C. Davidson to include three major steps. The first step, aerodynamic transport, carries contaminants from the free atmosphere into the relatively quiescent layer close to the surface, which can be described using the friction velocity, stability class, and other parameters pertinent to turbulent flow. The second step is boundary layer transport of contaminants across the viscous layer of air, immediately adjacent to the surface. Analogies with momentum and heat transport across boundary layers are often used to describe contaminant mass transport in the viscous layer. The third step refers to interactions of the contaminants with the surface. For gases, this step describes adsorption and absorption interactions. For particles, it is important whether they adhere to the surface or bounce off.

The processes that govern the formation of rain, the scavenging of aerosol particles both within and below clouds, and the effects of aerosol size on these processes were discussed by L. Spokes, including problems as-

sociated with the collection and determination of wet fluxes, chemical reactions occurring in rainwater and controlling the pH and the aerosol solubility, and the importance of episodic high-concentration deposition events and their effect on surface water biogeochemistry.

Long-Range Transport

The East Mediterranean Region is influenced by "European" air masses that are high in anthropogenic pollutants. This import is compounded by the scavenging of alkaline Saharan dust, which has a magnified effect on cloud physics and chemistry and, subsequently, on natural precipitation, cloud seeding, and deposition onto terrestrial and aquatic ecosystems.

Recent investigations of long-range transport of European pollutants to Israel were discussed by P. Alpert, who calculated monthly cyclonic tracks over the Mediterranean based on European Center for Medium-Range Weather Forecasts (ECMWF) data. Summer back trajectories from Tel Aviv pointed to sources spreading from Southeast Russia to Southern Europe, Spain, and North Africa. Z. Levine speculated that transported particles that pass through clouds are affected by wet chemical reactions and by physical processes, leading to the formation of dust particles coated with soluble salts such as sulfates from industrial origin or from dimethyl sulfide naturally emitted by the Mediterranean itself. Gas scavenging and subsequent liquid-phase oxidation add additional sulfate. The soluble coating of the mineral dust particles could significantly change their ability to serve as cloud condensation nuclei (CCN), causing cloud water to redistribute into larger concentrations of smaller droplets.

Sulfur-coated particles were reported by D. Rosenfeld to prevent rain droplets from forming in low clouds and, possibly, to cause lower rainfall. "Polluted" clouds are composed of much smaller droplets, without any precipitation echoes detectable by precipitation radar.

The Regional Atmospheric Modeling System (RAMS) for meteorological simulations and the Hybrid Particle and Concentration Transport (HYPART) package for dispersion modeling were used by M. Luria to explain the transport of polluted air masses toward the coast of Israel. Specific synoptic and wind conditions over the Eastern Mediterranean govern the movement of polluted air masses toward Israel. In one case study involving aircraft measurements, prevailing northwest winds forced the pollution from Southern Europe and the Balkans into the Eastern Mediterranean coast along the 180-km flight path, significantly increasing the average measured concentrations of SO_2 , NO_x , O_3 , and particulate sulfate.

Short-Range Transport

W. Kordel described aerial short-range-transport for pesticides; direct spray drift occurred during applica-

tion and by volatilization from the target area in the post-application phase. Pesticide concentrations in nontarget plants exceeding 10% of the actual pesticide concentration in the target plants were observed in neighboring nontarget ecozones, which may cause unintended effects on fauna and flora. Particularly for semivolatile pesticides with vapor pressures between 5×10^{-3} and 10^{-6} Pa, this relationship is important. The observed shelter effects of downwind hedges were low.

Ozone Depletion

Photochemistry of NO_2 is the main source of O_3 in the ground and boundary layer. L. Klasinc showed that, in Croatia, the O_3 concentration has more than doubled recently and is still rising. Vertical fluxes of O_3 and energy over a plant growth cycle in a large coniferous forest of Southwest France were reported by Lopez et al.; they indicated the effects of dry, wet, and dew conditions on O_3 deposition velocity, and the effect of stomatal conductance on increased deposition velocity during the day.

Atmospheric reactive BrO was measured, and its effect on O_3 ozone chemistry was assessed over the Dead Sea in Israel by Peleg et al., who reported a negative diurnal repeating cycle of O_3 and BrO variations, correlated with solar radiation and wind direction. During the elevated BrO events, O_3 regularly decreased from noontime levels of 50–80 ppb or higher down to 10–30 ppb and occasionally to levels below the detection limit of 5 ppb. Interaction of atmospheric oxidants with bromide at the salt pans of the Dead Sea were stipulated to be the source of BrO. The only other places where this kind of chemistry occurs are over the Arctic and Antarctic.

Trace Metals

A literature survey of published concentrations of atmospheric trace metals above the North Sea and the English Channel over the period 1971–1994 was conducted by Van Grieken et al. Of the six trace metals—Cd, Cu, Pb, Zn, Ni, and Cr—that were evaluated, Pb, Zn, and Cd showed a very strong decreasing trend with time. Similarly, a seasonal variability of atmospheric Pb concentrations over the English Channel was reported by Puskaric et al.; they indicated a decrease by about one order of magnitude over the last fifteen years and a different isotopic signature for Pb aerosols from Eastern Europe versus those originating in Western Europe. Cd, Cu, Pb, Zn, and natural elements (Al, Fe, Mn, and Cr) were also measured in dry atmospheric inputs at the coast of Israel, where mixing and dilution effects of European emissions with local emissions are taking place (Herut et al.).

Fossil fuel combustion sources and incinerators are the major sources of reactive gas phase Hg (RGM). Compared to elemental Hg^0 , which has a slow removal

rate from the atmosphere (low solubility in water), RGM is extremely water-soluble and efficiently removed from the atmosphere during rain events. Hg deposition studies are being conducted by Mamane et al. for Hg, RGM, and total particulate mercury (TPM) to model the Hg emission in Europe, as well as its transport and deposition on the South Baltic Sea and the Mediterranean Sea.

Organic Pollutants

Gas-phase POPs over Lake Michigan have been studied by Hornbuckle et al., who employed the Lake Michigan Mass Balance Project to identify the large summertime “plume” of gas-phase PCBs from Chicago, differentiating between short-range (higher molecular weight congeners) and long-range atmospheric transport (lower molecular weight congeners).

Nitrogen and Sulfur Compounds

Owing to the discontinued use of soft coal, emissions of SO₂ over Europe have been reduced by 55% since 1980, resulting in lower concentrations of S-components in air and precipitation. In the meantime, the emissions of NO_x, contributing to acidification and to photochemistry, remain very much the same today as in 1980, although long-term studies of nitrate concentrations in precipitation from the early 1980s to the present seem to indicate that concentrations have been falling (Schaug et al. and N.O. Jensen). It was shown that large inputs of alkaline species and a relatively high abundance of Ca and NH₄⁺ cause neutralization of the acid rain. In this context, a rather neutral value of pH 6.4 in the precipitation of Ankara, Turkey was reported by Incecik.

Saharan Dust

The Saharan dust is an important component in wet deposition, accounting for approximately half of the annual deposition of Al and Fe in the Eastern Mediterranean region. Tuncel et al. showed that the dust particles are potential CCNs, an atmospheric sink for trace gases, and a major factor in the neutralization of rain acidity by CaCO₃. Rudich et al. further suggested that mineral particles are coated with organic compounds, which can potentially influence the hydrophilic behavior of the particles and their optical properties. Danin also speculated that airborne dust trapped in vegetation is an important factor in the amelioration of growth conditions and functions as a trap of eolian dust, thereby avoiding soil erosion. Ganor et al. showed that dustfall generated locally and dust storms originating in North Africa are deposited over the Sea of Galilee in Israel. Calcite, quartz, feldspar, dolomite—and, to a lesser extent, gypsum and halite, and clay minerals, such as kaolinite, illite, and palygorskite—can be as much as 60% of the total solid input into the lake.

Conclusions

The symposium and the associated discussions focused on the issue of atmospheric deposition and its impact on ecosystems and highlighted ongoing research and problems that still need monitoring. The symposium provided the scientific basis for effective emission, mitigation, and adaptation policies, emphasizing the:

- numerous sources of polluting emissions;
- chemical transformation processes of pollutants in the atmosphere;
- relationship between sources and effects, which is not always easy to establish;
- deficiency of point measurements, which are not sufficient to characterize air quality in a particular region because the information about transport or atmospheric chemistry is missing; and
- need for integration of atmospheric pollutant concentrations and deposition, which are intricately related and need to be studied together.

The symposium also emphasized the need for:

- improving the knowledge of cause–effect relationships between air pollution and factors affecting conditions and health of ecosystems,
- improving prediction and detection,
- better ways of monitoring the environment,
- international standards for measuring and reporting emissions, and
- necessary regional and international cooperation.

These issues are of a global dimension, and regional and international coordination is highly essential. Therefore, the role of conventions, for example, the Helsinki Commission (HELCOM) for the Baltic Sea, the Oslo and Paris Commission (OSPAR) for the North Sea and Northeast Atlantic, the Barcelona Convention for the Mediterranean, and the UNDP Regional Seas Program, should be strengthened, as well as the institutions involved in measurement of air and precipitation quality and database formation, such as the Norwegian Institute for Air Research (NILU).

Acknowledgments

The authors are grateful to IUPAC and to all the contributors who made this symposium a successful event.

Epilogue: Coding Scheme for Properties in Laboratory Medicine

Since 1995, the Committee on Nomenclature, Properties, and Units (C-NPU of IFCC and IUPAC) has published nine papers on a coding system (i.e., a structure or a framework for the pairs of codes and meanings) and a coding scheme (i.e., the pairs of codes and their meanings) for properties in laboratory medicine.

“Meanings” can be descriptions of properties that are measured or observed in laboratory medicine. These manuscripts have been published in *Pure and Applied Chemistry (PAC)* and elsewhere (see references in articles cited just ahead), and recently four more papers have been published in *PAC* as Technical Reports with codes in the domains of Pharmacology and Toxicology (Vol. 72, No. 3, pp. 479–552, 2000), Clinical Microbiology (Vol. 72, No. 4, pp. 555–745, 2000), Clinical Chemistry (Vol. 72, No. 5, pp. 747–972, 2000), and Allergology (Vol. 72, No. 6, pp. 1067–1205, 2000). The codes offer unique and sufficient information about the properties and are, therefore, extremely valuable in the transfer of information among laboratories and to the end users of laboratory information. The codes make it possible to translate the data to any language automatically. So far, the meanings have been tested for translation into 18 languages, including many of the European languages, Arabic, and Cantonese.

The coding scheme comprises a total of 10 083 pairs with the international coding scheme identifier “NPU” for properties, and a further 13 379 pairs for elements. These latter pairs are for use primarily as results of taxonomic investigations; for example:

- NPU16294 Secretion(Oropharynx)—Bacterium+Fungus; taxon = ATCC12600 (*Staphylococcus aureus*); ATCC12344 (*Streptococcus pyogenes*)

- NPU04062 Urine—Benzodiazepines; taxon = CAS846-49-1(Lorazepam); CAS439-14-5(Diazepam)

In order to test the functionality, the coding scheme has been successfully mapped to the various codes that are currently used in more than 50 medical laboratories in Denmark and Sweden. To accommodate national or local needs, special codes can be used.

The domains currently covered by the IFCC/IUPAC coding scheme are Allergology, Clinical Chemistry, IOC-Prohibited Drugs, Microbiology, Pharmacology, Reproduction and Fertility, Thromboses and Hemostasis, and Trace Elements. The schemes have been prepared in collaboration with professional groups and organizations that represent the various specialities.

Coding schemes for Inborn Errors, Molecular Biology, Tissue Typing, and Transfusion Medicine are yet to be prepared.

The coding scheme is accessible at <http://www.ifcc-iupac.suite.dk>; for practical application, see <http://www.labinfo.dk/>.

See http://www.iupac.org/projects/1987/710_18_87.html for project description and update.

Committee on Nomenclature, Properties, and Units (C-NPU) of the International Federation of Clinical Chemistry (IFCC) and Laboratory Medicine and IUPAC

In Memoriam

Kurt Leopold Loening (1924–2000)

Kurt L. Loening, the world’s foremost expert and leader in chemical nomenclature, passed away at the age of 76 on 12 July 2000 in Columbus, Ohio, USA.

Dr. Loening was born in Berlin, Germany, in 1924. He also spent a few years growing up in French-speaking countries. When he came to the United States, he already had an early appreciation of languages and communications skills. He graduated from high school in New York City in 1942 and received his B.Sc. degree in chemistry from The Ohio State University (OSU) in 1944. After a tour of duty with the U.S. Army Chemical Warfare Service, he returned to OSU to pursue research in physical chemistry. He received his Ph.D. in 1951.

Dr. Loening joined Chemical Abstracts Service (CAS) in the same year. His 39-year career at CAS linked him with many of the persons who were pillars

of the organization. In his early days, he worked under the tutelage of CAS Editor E. J. Crane, former Editor and consultant Austin M. Patterson, and Associate Editor Leonard T. Capell. His primary mentor was W. Russell Stemen. In 1964, Dr. Loening succeeded Capell as Director of Nomenclature at CAS, a post he held until his retirement in 1990. His early contribution to the development and application of chemical nomenclature to the Chemical Abstracts (CA) Volume and Collective Indexes was a thorough documentation of CAS naming and indexing policies, of which the present Appendix IV of the CA Index Guide is a direct descendant.

Outside CAS, he served for 25 years as chairman of the American Chemical Society (ACS) Committee on Nomenclature. He also participated in the work of all of the IUPAC Nomenclature Commissions. His most enduring contributions were the reconstitution of the

IUPAC Commission on Macromolecular Nomenclature (IV.1), which he chaired for 11 years (1968–1977), and the founding of the IUPAC Interdivisional Committee on Nomenclature and Symbols (IDCNS), which he guided for another 11 years (1976–1987). The former produced pioneering documents dealing with nomenclature of polymers, and the latter assured conformity of all the IUPAC publications with the approved standards by establishing a publication procedure that allowed public comment before official approval of recommendations by IUPAC. He also served as a Member of the IUPAC Commission on the Nomenclature of Organic Chemistry (III.1) from 1963–1983, a Member of the IUBMB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN) from 1977–1985, and a Member of the IUPAC Commission on Microchemical Techniques and Trace Analysis (V.2) Subcommittee on Surface Analysis from 1987–1991.

Dr. Loening lectured and published widely, with work ranging from articles in journals to chapters in books and encyclopedias. His nomenclature and terminology topics covered all fields of chemistry, including history. In national and international circles, he was known for his patience and ability to reconcile differences of opinion among chemists of many nations and to forge consensus on sensitive nomenclature issues.

He did not hesitate to tackle controversial subjects such as recommending an 18-column Periodic Table of Elements, which is now an accepted standard worldwide, or criticizing some of the more recent decisions of the IUPAC Commissions.

When asked what he considered the highlight of his career, he answered that it was the opportunity to help chemists solve their nomenclature problems. He had often compared chemical nomenclature with linguistics, and was just as concerned as linguists are about the precision and specificity of expressions to avoid potential misunderstandings.

In 1987, Dr. Loening received the prestigious Patterson-Crane Award of the ACS Columbus and Dayton Local Sections for work in the documentation of chemistry in the development of chemical nomenclature and terminology. He was also a recipient in 1990 of the ACS Executive Director's Award for his many years of distinguished service to the ACS. He was elected a Fellow of the American Association for the Advancement of Science (AAAS).

In the decade following his retirement, he did not rest on his laurels. He founded, with Helmi Sonneveld of the Netherlands, a terminology consulting firm, Topterm, and was the Managing Director of its North American Division. He was a cofounder and a coeditor of the journal *Terminology*. For that achievement, he received in 1997 the A. A. Reformatskii Prize of the



Dr. Kurt L. Loening

Scientific Board of the Russian Terminological Society (RossTerm).

He traveled widely and was consulted by industrial companies, national and international government agencies, professional associations, and countless individuals worldwide. He served as a consultant to the WHO International Nonproprietary Names program, to the U.S. Adopted Names Council (USAN), and to the U.S. Pharmacopeial Convention. He was frequently asked to be an expert witness in matters involving legal litigation related to terminology and nomenclature.

Dr. Loening also held a post of Senior Research Associate in the Department of Chemistry of The Ohio State University, where now The Kurt Loening Endowment Fund in Chemical Nomenclature and Chemical Information has been established.

Outside purely scientific pursuits, he was involved in harness racing for many years as a horse owner. Nothing gave him a greater pleasure than occasionally winning the purse. His horse, Good Lover, was the Ohio Sire's Stakes Champion for three-year old pacers in 1991.

Kurt Loening will be greatly missed by many around the world.

Dr. W. V. Metanomski

Secretary, IUPAC Interdivisional Committee on Nomenclature and Symbols (IDCNS)

New Projects

Visit <http://www.iupac.org/projects/> for complete information and further links.

Soil and Water Bioremediation: *In-Situ* Treatment of Polluted Soil and Water with Emphasis on the Use of Genetically Engineered Microorganisms

IUPAC has approved a project to prepare a critical review of the state-of-the-art of the removal of hazardous chemical contaminants from liquid, solid, and gas phases using biological processes, including bioremediation of leachates, toxic industrial wastewa-

ter, soils, and sediments. Emphasis will be placed on novel application of genetically engineered microorganisms for bioremediation. Comments from the chemistry and environmental community are welcome and should be addressed to the project coordinator, Dr. Raphi Mandelbaum, LDD Technologies, POB 3506, Petach Tiqva, Israel 49130, Tel.: +972 3 937 3740; Fax: +972 3 937 3770; E-mail: rm.ddd@neopharm-ltd.co.il.

See http://www.iupac.org/projects/2000/990132_600_00.html for project description and update.

News and Notices from Other Societies and Unions

Formulating International Ethical Guidelines for Science (ICSU-SCRES)

Dr. Kathinka Evers (Postbox 522 Sentrum, 0105 Oslo, Norway; Tel.: +47 23 31 83 17; Fax: +47 23 31 83 01; E-mail: evers@online.no), Executive Director of the Standing Committee on Responsibility and Ethics in Science (SCRES) recently established by the International Council of Scientific Unions (ICSU), has contributed the following article, along with a request for comments on it to be sent to her in English, French, German, Spanish, Swedish, Danish, or Norwegian. A more complete description of this new ICSU-SCRES project was presented as a background paper for the World Science Conference held 26 June–1 July 1999 in Budapest, Hungary and recently published in *Science and Engineering Ethics* **6**, 131–142 (2000).

SCRES focuses part of its present activities on *the possibility of formulating international ethical guidelines regulating scientific research*. Ethical guidelines have been formulated to regulate activities within various scientific disciplines, and some of these go beyond the national perspective (e.g., the ban on human experimentation without informed consent). Ethics in science has gained increasing relevance in the past decades when the development of science has been very rapid, and traditional values and familiar moral intuitions appear threatened by some discoveries, as the heated debate around, for example, mammal cloning illustrates. Understanding of this development is limited to a select minority, which raises questions of how best to spread scientific education. The public perception of science has deteriorated dramatically in recent decades, and we need to develop an instrument to promote public trust in science. Modern science and technology exert strong influence on the world's development, a power that can be dangerous unless restrained

by principles or guidelines. Calls for international guidelines regulating scientific research on a global front have become more frequent, for example, concerning socioeconomic development, sustainability of natural resources, world peace, quality of life, equity among nations, handling of scientific data, or problems in cyberspace.

The question is: Given the plurality that reigns within ethics as a result of different cultural backgrounds, political or financial systems, religious or other ideologies, levels of development, socioeconomic systems, etc., is it possible to find international norms that combine broad acceptance with substance in their formulation? The institutions of science may provide a context for eliciting norms—this pluralism notwithstanding. Assuming that this convergence is, in principle, possible and sufficiently realistic to be a worthwhile pursuit, in which scientific contexts might such guidelines be desirable? A few have been mentioned, but there are others.

The object under analysis would be a group of related concepts: codes of *conduct*, *guidelines*, *oaths*, and *pledges*, notably. The primary concept is the guideline or code. An oath or a pledge makes appeal to a principle that must be universalizable, for example, applicable to all individuals in relevantly similar circumstances. This principle (or a cluster of them) constitutes the code or the guideline that can—but need not—be expressed in a ceremony where the individual swears to follow its dictate. Oaths are, therefore, conceptually secondary to codes. Some call for an oath for scientists to be developed, because they feel that the ceremony might serve to make individuals more aware of the ethical principles to which the oath (or the pledge) would appeal. Others are worried that this practice can make ethics seem optional, for an oath concerns only those who swear it. This situation might perhaps be avoided if all members of a given group are obliged to swear

the oath in order to enter that "society of honor". The objection has then been raised that this image is antiquated. The primary task from SCRES's point of view is to analyze actual or possible codes and guidelines. A discussion whether to express them in an oath or a pledge may follow but cannot precede that task. It should be noted that any pledge for science must be a part of a larger social-political dialogue.

The subjects concerned are the individual scientists, but also scientific institutions—academies, unions, associations, etc. When a code is binding for a given group, it articulates a *cooperative practice* for all the members of that group. This practice may relate to individual moral qualities (such as honesty, conscientiousness, and integrity) or to the group's social relationship (e.g., to the state, or to bodies providing or offering financial support). (The group may assert social duties, political neutrality, and incorruptible academic freedom, or its codes may require a different approach). Generally, it is important to distinguish between individual and communal perspectives. Clearly, the individual scientist cannot be held responsible for any and all applications of her or his research in a broader communal context. There is an equilibrium to be found between individual and communal responsibility. Furthermore, the individual scientist acts in a variety of roles that

need to be distinguished, for each carries different (not necessarily compatible) responsibilities, and the relevant codes of conduct will vary accordingly. In particular, we may note the difference between the scientist *qua* researcher, author of reports, social consultant, political tool or advisor, and advocate/witness.

Within a national perspective, the relationships between ethical codes for science and, for example, educational strategies and laws are relevant to establish. In international contexts, this exercise is equally important, but considerably more difficult. Already within Europe there are profound cultural disparities in the attitudes toward "acceptable" behavior in science, and these differences appear to deepen when distinct continents are compared. Nevertheless, there seems to be a need for international agreements in many ethical issues, such as socioeconomic development, sustainability of natural resources, world peace, quality of life, equity among nations, handling of scientific data, or problems in cyberspace. It is, therefore, worthwhile to investigate if we can find a "smallest common denominator" that might form a foundation for international agreement. In this context, it will be of interest to draw comparisons to the declaratory tradition in international law and to the UN Charter.

New Books and Publications

New Publications from the World Health Organization

Quality Assurance of Pharmaceuticals: A Compendium of Guidelines and Related Materials, Volume 2: Good Manufacturing Practices and Inspection

1999, v + 196 pages (available in English; French in preparation), ISBN 92-4-154526-7, CHF 62.-/USD 55.80; In developing countries: CHF 43.40, Order No. 1152452. WHO Marketing and Dissemination, CH-1211 Geneva 27, Switzerland; E-mail: bookorders@who.ch; Tel.: +41 22 791 24 76; Fax: +41 22 791 48 57.

This book draws together 12 WHO guidelines related to good manufacturing practices (GMP) and to the inspection of pharmaceutical manufacturers and drug distribution channels. Most of these guidelines have appeared as annexes in various reports of the WHO *Expert Committee on Specifications for Pharmaceutical Preparations*. By making these guidelines available in a single reference work, the book facilitates access to the complete body of WHO guidelines and recommendations aimed at ensuring that pharmaceutical prod-

ucts are manufactured in compliance with internationally accepted standards for quality and safety.

Guidelines are presented in four chapters. Chapter 1 reproduces the core GMP guidelines, which set out the philosophy and essential elements of GMP and define good practices in production and quality control. Guidelines for the validation of manufacturing processes explain and promote the concept of validation embedded in the core GMP texts. The guidelines can also be used to establish priorities and select approaches when a validation program is being developed. Chapter 1 concludes with an explanatory text describing the role, functions, and training of the person authorized to release batches of finished products for sale.

The two guidelines in the next chapter, on starting materials, provide GMP for active pharmaceutical ingredients and for the manufacture of pharmaceutical excipients. As strict application of full GMP is not always practical or necessary for starting materials, these guidelines outline the procedures and practices that manufacturers should employ to ensure that the methods, facilities, and controls used for their production are operated or managed so that pharmaceutical starting materials have the quality and purity appropriate for use in finished pharmaceutical products.

Chapter 3 reproduces four sets of specialized guidelines for specific pharmaceutical products. Guidelines for sterile pharmaceutical products cover the additional steps necessary to minimize the risks of microbiological, particulate, and pyrogen contamination in sterile products. The second guidelines set out GMP for the special case of products manufactured with biological materials and processes. GMP for investigational products specifically address those manufacturing practices that may be different, given the fact that investigational products for clinical trials in humans are not usually manufactured in accordance with a set routine, and may be incompletely characterized during the initial stages of clinical development. Chapter 3 concludes with GMP for the manufacture of herbal medicinal products, giving particular attention to procedures and techniques that are substantially different from those employed in the manufacture and quality control of conventional products.

The final chapter includes provisional guidelines for the inspection of pharmaceutical manufacturing facilities, aimed at enforcing GMP compliance, and guidelines for the inspection of drug distribution channels, aimed at ensuring that drug quality is maintained throughout the pharmaceutical supply system or distribution network.

WHO Expert Committee on Biological Standardization, 48th Report, Technical Report Series No. 889

1999, vi + 111 pages (available in English; French and Spanish in preparation), ISBN 92-4-120889-9, CHF 23.-/USD 20.70; In developing countries: CHF 16.10, Order No. 1100889.

This report presents the recommendations of a WHO expert committee commissioned to coordinate a range of research and other activities needed to assure the purity, potency, safety, and stability of biological products used in medicine. Work includes the development and adoption of detailed requirements for the manufacturing, licensing, and control of vaccines and other biologicals. The committee also coordinates the establishment of international reference materials for measuring the potency and other characteristics of biological products. These reference materials are used worldwide and play a crucial role in ensuring the comparability of products on a global basis.

The report has four parts. The first provides a brief discussion of general issues that shape the committee's work. Issues discussed include progress in the establishment of cytokine standards, efforts to harmonize technical requirements for vaccine production and licensing, implications for vaccine requirements of the Agreement on Technical Barriers to Trade of the World Trade Organization (WTO), and safety questions arising from the detection by very sensitive polymerase

chain-reaction-based methods of low levels of reverse transcriptase activity in live viral vaccines prepared in chicken cells.

The second part provides a brief review of the status of some 15 international guidelines, requirements, and related documents relevant to the manufacture and quality control of biologicals. Part 3 summarizes activities relating to the status and development of biological reference materials for various antibodies, antibiotics, blood products and related substances, cytokines and growth factors, and other substances requiring international reference materials.

The fourth and most extensive part issues detailed guidelines for the production and control of synthetic peptide vaccines, requirements for tick-borne encephalitis vaccine (inactivated), and guidelines for thromboplastins and plasma used to control oral anti-coagulant therapy. Also included are an amendment to the requirements for hepatitis B vaccine made by recombinant DNA techniques, and a report on the standardization and calibration of cytokine immunoassays.

Health Effects of Interactions between Tobacco Use and Exposure to Other Agents, Environmental Health Criteria No. 211

1999, xx + 149 pages (English, with summaries in French and Spanish), ISBN 9-4-157211-6, CHF 36.-/USD 32.40; In developing countries: CHF 25.20, Order No. 1160211.

This book evaluates the findings of close to 600 studies aimed at determining whether the health risks associated with tobacco use are enhanced by coexposure to numerous chemical, biological, and physical agents commonly found in the workplace. Coexposures in the domestic and general environment, which are especially important in newly industrializing countries, are also considered in this comprehensive review. Although all forms of tobacco use are covered, particular attention is given to risks arising from exposure to mainstream and sidestream smoke from cigarettes.

The book has four chapters. The first summarizes what is known about the health risks caused by tobacco use. A brief overview of the history of tobacco use is followed by a detailed explanation of the chemistry of processed tobacco and the many toxic compounds found in tobacco and in mainstream and sidestream smoke. The chapter also includes an overview of all documented acute and chronic adverse effects, including chronic obstructive lung disease, chronic bronchitis, small airways disease, emphysema, pulmonary fibrosis, many forms of cancer, and effects on the cardiovascular system. The chapter concludes with a review of evidence demonstrating the health hazards of smokeless tobacco.

The second and most extensive chapter evaluates the evidence on health effects caused by interactions be-

tween tobacco smoke and asbestos, nonasbestos fibers, seven inorganic chemicals, five organic chemical agents (including ethanol), four physical agents, and seven biological agents (including two widespread infectious agents). The chapter also includes an explanation of the concept of interaction and how it can be measured, a discussion of vector effects (whereby cigarettes become contaminated with toxic chemicals in the workplace), and a review of data indicating that tobacco smoking can alter the metabolism of therapeutic drugs and other chemicals.

Chapter 3 considers whether adverse effects following coexposure to tobacco smoke and other agents are separate effects or possible interactions. The evaluation draws on data from studies of coal mining, other mineral dusts, fibrous minerals, metals, pesticides, and exposure in the rubber and petroleum industries.

The report found evidence for synergism in the production of adverse effects, including cancer, between tobacco smoking and exposure to asbestos, ethanol, silica, and radiation. The report also found evidence that tobacco smoking affects the health risks of exposure in coal mining, pesticide handling, and in the rubber and petroleum industries. In addition, tobacco smoking can increase the risk of byssinosis produced by exposure to cotton dust, and nasal cancer caused by exposure to wood dusts.

On the basis of this evaluation, the final chapter concludes that all possible measures should be taken to eliminate tobacco use, particularly smoking. To avoid interaction with occupational exposure and to eliminate hazards arising from exposure to environmental tobacco smoke, the report concludes that smoking in the workplace should be prohibited. Moreover, because smoking can result in altered responses or adverse reactions to drugs and other treatments, appropriate dose adjustments and patient surveillance should be taken into consideration by clinicians.

Principles and Methods for Assessing Allergic Hypersensitization Associated with Exposure to Chemicals, Environmental Health Criteria No. 212

1999, xxix + 399 pages (English, with summaries in French and Spanish), ISBN 92-4-157212-4, CHF 84.-/USD 75.60; In developing countries: CHF 58.80, Order No. 1160212.

This book summarizes current understanding of the complex interactions between chemicals, the immune system, and target organs that lead to manifestations of allergic hypersensitivity and autoimmunity. Noting that the incidence of allergic disorders has increased significantly in many countries, the book responds to the urgent need to improve methods for detecting potential allergens and predicting their effects in both individuals and populations. The need for better preventive strategies and therapeutic options is also considered, par-

ticularly in view of the high costs of allergic disorders in terms of health care and time lost from work.

Addressed to researchers, the book concentrates on what is known about the mechanisms of sensitization and autoimmunity elicited by numerous industrial chemicals, adjuvant environmental factors (such as air pollution, tobacco smoke, and ultraviolet radiation), and food allergens with a proven involvement of the immune system. Although a large number of allergies are covered, particular attention is given to asthma and contact dermatitis as major occupational diseases undergoing intensive investigation. Throughout, a special effort is made to identify lines of investigation that will lead to a better understanding of fundamental mechanisms and thus improve the prospects for treatment and prevention. Over 1 000 references to the literature are included.

The book opens with a detailed explanation of the structure and functional processes of the immune system, followed by a discussion of the mechanisms by which chemicals can disrupt these functions. Also discussed are fundamental concepts of immunosuppression, immunodeficiency, and immunological tolerance that help explain the mechanistic basis of sensitization, allergic responses, and autoimmunity.

Chapter 2 provides an overview of mechanisms involved in four major types of hypersensitivity and in autoimmunity. Mechanisms are illustrated with examples of diseases—from occupational asthma, through myasthenia gravis, to chronic beryllium disease—where exposure to environmental chemicals might play a role. The numerous hypotheses put forward to explain the mechanisms of autoimmune reactions are also critically assessed. Factors influencing allergenicity are covered in chapter three, which concentrates on the many complex endogenous and exogenous factors that govern the induction of allergic responses.

Against this background, Chapter 4 discusses clinical aspects of the most important allergic diseases, which include allergic contact dermatitis, atopic eczema, allergic rhinitis and conjunctivitis, allergic asthma caused by contact with chemicals, food allergy, and autoimmune diseases associated with drugs, chemicals, and environmental factors. Each disease is profiled in terms of its epidemiology, clinical manifestations, etiology, pathogenesis, diagnosis, and strategies for treatment and prevention.

The remaining chapters review the epidemiology of asthma and allergic disease (including trends over time in different geographical regions), describe procedures for hazard identification through the demonstration of allergenicity, and explain how the principles of risk assessment can be applied to allergy.

The book concludes with a glossary of terms, followed by 15 precise recommendations for the protection of human health and a list of priorities for further research.

Awards and Prizes

William Horwitz Receives Robert Boyle Medal from Royal Society of Chemistry

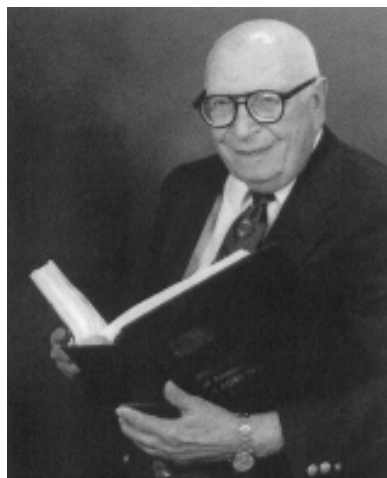
Dr. William Horwitz, current Associate Member and former U.S. National Representative on IUPAC's Commission on General Aspects of Analytical Chemistry (V.I), has received the prestigious Robert Boyle medal of the Royal Society of Chemistry. His medal citation, which appeared in the June 2000 edition of *Chemistry in Britain*, Vol. 36, No. 6, p. 62, reads as follows:

"Distinguished for his contributions to the quality of analytical measurements and to the statistics of data treatment, including the discovery of the Horwitz function, which relates the reproducibility of such measurements to analyte concentrations".

Bill Horwitz's luminous career as a leading analytical chemist was summarized in the *Chemistry in Britain* article in the following words:

William Horwitz is the scientific adviser to the Office of Special Research Skills at the Center for Food and Applied Nutrition of the U.S. Food and Drug Administration (FDA) in Washington, DC. He received his first degree from the University of Chicago and his Ph.D. from the University of Minnesota. He has spent his entire professional career of over 57 years with the FDA, beginning as a chemist, then as chief chemist of the Minneapolis laboratory. After being transferred to Washington, he directed laboratory investigations on various aspects of analytical food chemistry and advised on the application of analytical chemistry to the regulation of foods and drugs. [Editor's Note: Dr. Horwitz joined the FDA in Minneapolis in 1939 and retired from the FDA in Washington, DC on 30 June 2000.]

He was executive director of the Association of Official Analytical Chemists (now AOAC International) for 28 years and editor of six editions of its *Official*



Dr. William Horwitz

Methods of Analysis. He is the U.S. delegate to the FAO/WHO Codex Committee on Methods of Analysis and Sampling and is a member or adviser to several other Codex committees. He was also chairman of the U.S. Technical Advisory Group to the International Standardization Organization (ISO), Technical Committee 34, on Agricultural Food Products. He was an abstractor and section editor of *Foods for Chemical Abstracts* for over 40 years. He has received several awards from the U.S. Department of Health and Human Services, including their superior and distinguished service awards and the Harvey W. Wiley award of AOAC International.

In 1995, AOAC International established the William Horwitz award, of which Dr. Horwitz was the first recipient. He is the author of over 140 papers on various aspects of analytical food and drug chemistry and the reliability of chemical analysis, and he has lectured on these subjects at many universities and to chemical societies from Australia to Israel.

Provisional Recommendations

IUPAC Seeks Your Comments

In this section, we publish synopses of IUPAC's latest provisional recommendations on nomenclature and symbols. All comments on these recommendations are welcome and will be taken into consideration. The final revised versions are published in *Pure and Applied Chemistry*.

If you would like to comment on the provisional

recommendations, please visit the IUPAC web site at <http://www.iupac.org/reports/provisional/index.html>, where the full texts are available for downloading as draft pdf files. Alternatively, you can write to your nearest national/regional center to request a copy; the most recent list of national/regional centers is available on the web site at the address above and last appeared in *Chemistry International* **17**, 141 (1997).

Macromolecular Division. Commission on Macromolecular Nomenclature—Definitions Relating to Stereochemically Asymmetric Polymerizations

<http://www.iupac.org/reports/provisional/abstract00/baron_300401.html>

Asymmetric polymerization has been the interest of many academic and industrial polymer scientists, but no reference has been made by IUPAC explicitly to definitions of reactions involving the asymmetric synthesis of polymers. Hence, this document presents defi-

nitions concerned with asymmetric and related polymerizations, with examples included to clarify the meaning of the definitions. Asymmetric polymerizations embrace two main categories, “asymmetric chirogenic polymerizations” and “asymmetric enantiomer-differentiating polymerizations”.

Comments by 30 April 2001 to Prof. Maximo Baron, Catedra de Fisica, Facultad de Ciencias Exactas y Naturales, Universidad de Belgrano, Villanueva 1324, 1426 Buenos Aires, Argentina. Tel.: +54 11 4511 4700; Fax: +54 11 4821 4887; E-mail: baron@ub.edu.ar.

Reports from Commissions and Division Committees

Chemistry and Human Health Division Committee

Summary of Minutes of Division Committee Meeting at IUPAC General Assembly, Berlin, Germany, 10 August 1999

Division President Prof. Camille-Georges Wermuth chaired the meeting and welcomed the 13 participants, comprising members of the Sections of Medicinal Chemistry and Clinical Chemistry and their commissions.

Recent discussions and decisions that had taken place during the General Assembly (GA) meetings in Berlin—especially the strategic plan to restructure IUPAC—were discussed, including the new project evaluation process. Main criteria of the evaluation will be usefulness according to the strategic plan, improvement of the image of IUPAC, and maintenance of a high scientific standard.

Deliberations during the GA yielded several new projects within the Division, which should be submitted at the earliest convenience and completed within the next two years.

The Section on Medicinal Chemistry presented the following projects:

- “Natural and unnatural substances”. This publication addresses scientists, laymen, and the press. It is intended to make the public more aware of the similarities between natural and synthetic compounds and the health risks associated with natural and herbal remedies, vitamins, nutrients, etc.
- “Database of drug metabolites for individualized drug treatment”. This project involves cooperation with ICSU and coordination by IUPHAR.
- “Compendium of glossaries” and “Compendium of nutraceuticals” (Coordinator, Dr. Mukund S. Chorghade).

The Section on Clinical Chemistry discussed the following proposals:

- “Recommendation on nanotechnology in the clinical laboratory”.
- “Recommendations on quality management, practices, and procedures for decentralized clinical measurements”.
- “Database on chemical disasters and hazards. Measurements and markers in exposed people as part of a global network”. This database shall serve as an ongoing reporting system for detection, identification, and monitoring of the effects of industrial chemical waste on human health. The project is to provide recommendations for procedures to be used for collection and analysis of samples and reporting of the impact of studies. It should be developed in association with WHO.

The Commission on Nomenclature, Properties, and Units (VII.C.1) has eight ongoing projects to be finished before 2001 and proposed three new projects. The Commission on Toxicology (VII C.2) will continue with three ongoing projects and presented proposals for seven new projects, which have been generated during this GA, partly through interdivisional discussions.

President Prof. Wermuth called for early distribution of project applications and emphasized the need for new input and activities and projects directed toward chemistry and human health. According to the IUPAC strategic plan, most of the commissions will be dissolved and the work will be done by project teams, with extra input and expertise from outside of IUPAC. Some commissions, however, may continue; the Commission on Nomenclature, Properties, and Units might be a candidate. Decisions will be made in 2001; until then, ongoing projects will continue under the old system, and new ones will be initiated under the new system. It was agreed to maintain the working structure of the Division, with two sections and the existing com-

missions, but to integrate the disciplines more into the future global structure of the Division of Chemistry and Human Health. The positions of president and secretary for the Sections and Commissions were filled, but four positions for Titular Members (TM) were left open for new members in order to broaden the aspects of chemistry and human health beyond medicinal and clinical chemistry and to encourage input from other fields related to human health.

A subsequent Division Meeting was held in Brussels, 10–11 March 2000.

Birger Heinzow
Secretary, IUPAC Chemistry and Human Health
Division Committee

Commission on Toxicology—VII.C.2

Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999

Eleven members of the Commission on Toxicology (VII.C.2) met for three days during the 40th General Assembly in Berlin.

Reports were given by Chairman Dr. John H. Duffus and by members of the commission who served on the scientific advisory committees of the following IUPAC-sponsored scientific meetings and proceedings: 1st International Conference on Trace Element Speciation in Biomedical, Nutritional, and Environmental Sciences (4–7 May 1998, Munich, Germany); 5th International Symposium on Metal Ions (Munich, Germany); and 15th International Conference on Chemical Education (9–14 August 1998; the first in Africa, during which a presentation on the Curriculum on Toxicology was given as part of the Clinical Chemistry Symposium). A short report on the Cairo Conference Symposium, “Tertiary Vocational Training in Chemistry Related to Health Care”, prepared by Dr. Howard G. J. Worth, has been published in *Chemistry International*, Vol. 20, No. 6, pp. 171–172, 1998.

The ongoing projects “Biological Monitoring for Exposure to VOCs” (IUPAC Recommendations 2000, *Pure and Applied Chemistry*, Vol. 72, No. 3, pp. 385–436, 2000), “Exposure Assessment and Decision Rules in Compliance Testing for Implementation of Exposure Limits”, “Exposure Assessment Using the Logbook Method”, “Risk Assessment Methodology”, “Educational Material”, and “Modeling Outdoor Exposure and Risk Assessment of Particulate Matter” are most likely to be completed by 2001.

As a joint project agreed with the Committee on Teaching of Chemistry (CTC) at the General Assembly

in Geneva in 1997 and previously discussed in Cairo in 1998, Dr. Duffus has prepared a draft of “Toxicology: An Introduction” for use as a resource in school chemistry courses. The final version has been circulated within the CTC and Commission VII.C.2 and was discussed during a joint meeting with the CTC in Berlin. About 120 pages of educational material will be made available to download from the Internet, possibly from a Commission VII.C.2 web site, as a PowerPoint presentation that can easily be adapted to other languages. The material aims at courses on an introductory level (e.g., teaching at high schools) and might be especially useful for developing countries. From the discussion with the CTC, the need for a hard copy version was expressed, with the addition of case studies, (e.g., current cases of public concern). Material for a toxicology course is already available via the Internet at <http://www.med.ed.ac.uk/hew/tox/default.htm>.

Cooperation with the International Program on Chemical Safety (IPCS) will continue, as outlined at the 1997 meeting in Geneva with Dr. Mercier. An advanced toxicology textbook for schools is in the process of publication by IPCS following a review stage. Further cooperation with Commission VII.C.2 is appreciated by IPCS; the “IUPAC Glossary on Terms in Toxicology” has been used in the Organization for Economic Cooperation and Development (OECD) and IPCS project on risk assessment harmonization.

Dr. Duffus represented IUPAC as an observer at the IPCS Program Advisory Meeting in Berlin, 5–8 October 1998 (see *Chemistry International*, Vol. 22, No. 1, pp. 7–10, 2000). He also became a member of a team convened by the European Regional Office of WHO to harmonize environmental health terms used in papers prepared for the meeting of European Ministers of Health and Environment in London in 1999.

Dr. Duffus has been contacted about an interface session during the World Conference of IUTOX with participation by Commission VII.C.2. From the suggested topics, exposure assessment was regarded as most appropriate. A proposal for a half-day symposium consisting of four lectures and a joint chair (IUTOX + IUPAC) was formulated.

The Commission discussed the new system to be implemented by IUPAC, with regard to the effect of its future project-driven structure and function on possible new Commission VII.C.2 projects. The need for new input and activities and projects directed toward chemistry and human health was emphasized.

Commission VII C.2 will continue with three ongoing projects and presented proposals for seven new projects, which have been generated during the General Assembly in Berlin, partly through interdivisional

discussions. The seven new projects are listed below:

- Criteria for assessment and quality assurance of material to be presented on the Internet under the auspices of IUPAC. CTC and the Committee on Printed and Electronic Publications (CPEP) are suggested coordinators. (Project proposal by Dr. Duffus)
- Exposure assessment. IUPAC minisymposium within the 9th IUTOX Conference in Brisbane, 8–13 July 2001 (Coordinator: Dr. Duffus).
- Educational material for teaching chemistry related to case studies for risk assessment in toxicology. Senior high school level, in addition to the ongoing project "Toxicology: An Introduction" (Coordinator: Dr. Duffus; joint project with CTC).
- Modeling human exposure in the workplace (Coordinator: Dr. Erik Olsen).
- Exposure assessment for neurochemically active metals/manganese species (Coordinator: Dr. Jytte M. Christensen; participants: Prof. Douglas M. Templeton, Ingvar Thomassen, Dr. Erik Olsen, Harry Roels).
- Immunochemistry in metal exposure, possibly with a focus on nickel and beryllium (Coordinator: Prof.

Douglas M. Templeton; participants: Dr. Regine Heinrich-Ramm and Dr. Jytte Molin Christensen).

- Conference on risk assessment of particulate matter, with a focus on fibers. The proceedings will be published as a monograph (Coordinator: Prof. R. P. Nolan).

Dr. Duffus will continue as chairman, Prof. Douglas M. Templeton will become secretary, and Dr. Erik Olsen and Prof. Monica Nordberg are new Titular Members. Dr. Birger Heinzow became secretary of the Division. Prof. Dr. Laszlo Nagymajényi and Dr. Jytte Molin Christensen will be new Associate Members. New associate members will be contacted by the secretary, informed about ongoing activities, and invited to join existing projects and to generate and propose new projects.

The Commission met again 28 September–1 October 2000 in Szeged, Hungary.

Birger Heinzow
Secretary, IUPAC Commission on Toxicology
VII.C.2

Conference Announcements



designates IUPAC sponsorship.

6th Rio Symposium on Atomic Spectrometry, 3–9 December 2000, Pucon, Chile

Part I of this meeting will comprise a scientific program of plenary lectures, short oral presentations, and posters on atomic absorption, optical emission, atomic fluorescence, and inductively coupled plasma (ICP)-mass spectrometry. Specific topics will include the following:

- instrumentation developments
- new method developments
- vapor generation techniques
- sample preparation and pretreatment
- preconcentration
- sample introduction
- solid and slurry sampling
- interferences, their mechanisms and their prevention
- flow injection and miniaturization
- elemental speciation analysis
- quality assurance
- chemometrics in atomic spectroscopy
- applications in environmental, industrial, clinical, toxicological, biochemical, food, drug, agricultural,

hydrological, geological, mineralogical, metallurgical, and petrochemical samples; in process control and analysis; and in high-purity materials.

Part II of the symposium will consist of a workshop on fundamental studies and instrumental developments in electrothermal atomic absorption spectrometry, electrothermal vaporization, inductively coupled plasma, and optical emission and mass spectrometry, presented as research papers in invited lectures and short oral presentations.

For further information, contact the Coordinator, Prof. Dr. Carlos G. Bruhn, Departamento de Analisis Instrumental, Facultad de Farmacia, Universidad de Concepcion, P.O. Box 237, Concepcion, Chile; E-mail: cbruhn@udec.cl; Tel.: +56 41 204252; Fax: +56 41 231903; Web site: <http://www.udec.cl/6riosymp/>.

6th International Conference on Solar Energy and Applied Photochemistry, 3–8 April 2001, Cairo, Egypt

This conference and an associated workshop aim to provide a means of communication between scientists in different academic disciplines who share a common

interest in the fundamental and technological aspects of the electronic excited state of different systems. It will focus on research among the chemistry, physics, engineering, optics, electronics, materials science, biological, pharmaceutical, and medical communities.

The conference and its satellite training workshop will cover fundamental and applied aspects of the following topics:

- photochemistry and photophysics relevant to nanoscale and supramolecular science and technology
- analytical applications of fluorescence, bioluminescence, and chemiluminescence
- photobiology, photostability of drugs, and photodynamic therapy
- photocatalysis and photodegradation of pollutants in air, water, and soil
- photoconductivity, photovoltaics, and molecular photovoltaics of organic materials and new materials
- applications of photochemistry to molecules and various chemical systems, such as xerography, coatings, semiconductor microdevices, solar cells, fuel cells, electrochromism, photochromism, lasers, imaging, etc.

For more information, contact Prof. M. S. A. Abdel-Mottaleb, Photoenergy Center, Faculty of Science, Ain Shams University, Abbassia, Cairo, Egypt; E-mail: solar@photoenergy.org or solar@link.com.eg; Tel.: +20 12 216 9584 (cellular); Fax: +20 2 244 7683 or +20 2 484 5941; Web site: <http://www.photoenergy.org/solar2001.html>.

1st International Symposium on Macro- and Supramolecular Architectures and Materials (MAM-01): Biological and Synthetic Systems, 11–14 April 2001, Kwangju, South Korea

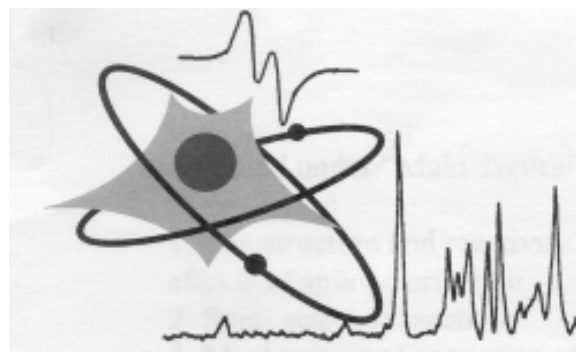
Major goals of this symposium include study of natural models for synthetic systems by integrating biomimicking concepts, investigation of effects and consequences of incorporating synthetic systems into biological systems (with emphasis on synergistic effects), and research on classical aspects of macro- and supramolecular architectures and materials.

The symposium will highlight cooperation between cell biology and materials science as the basis for the development of new biomaterials. Multiple sessions will be devoted to general topics, biological and biohybrid systems, and synthetic systems.

For further information, contact Prof. Kurt E. Geckeler or Prof. Pill-Soon Song, Symposium MAM-

01, Kwangju Institute of Science and Technology (KJIST), 1 Oryong-dong, Puk-gu, Kwangju 500-712, Korea; E-mail: mam@kjist.ac.kr or mam@matlb.kjist.ac.kr; Tel.: +82 62 970 2400; Fax: +82 62 970 2304 or +82 62 970 2338; Web site: <http://matlb.kjist.ac.kr/~mam/index-net.html>.

11th International Conference on Magnetic Resonance in Chemistry and Biology, 20–27 April 2001, Zvenigorod, Russia



The aim of this conference, organized by the Institute of Chemical Physics of the Russian Academy of Sciences (RAS) in cooperation with the Council of Pure and Applied Chemistry of the RAS and the International Electron Paramagnetic Resonance (EPR) Society, is to bring together scientists interested in the development of magnetic resonance techniques and experimental methods and their applications in chemical and biological research. Physical, inorganic, organic, analytical, applied, medicinal, and environmental chemistry will be covered. Three open forum discussion sessions will be featured on the following topics:

- nitric oxide in chemistry and biology
- advanced NMR imaging in biomedical fields and in solids
- the environment and magnetic resonance research

Main topic sessions will focus on the following applications:

- structure and reactivity of molecules, mechanisms of chemical reactions, and effects of spin polarization
- spin-selected reactions
- mechanisms of formation of complexes and radical reactions on surfaces
- structure and molecular dynamics of liquids, polymers, biopolymers, and micellar systems
- new approaches and progress in using spin labels and spin traps

- advanced magnetic resonance techniques and the environment; mechanisms of extreme effects on human health and the environment
- structure, biotransformations, mechanisms of drug actions, and effects of biologically active chemicals on cells
- nitric oxide in biological systems
- radical reactions in model biosystems; cellular and organismic processes
- NMR imaging in biomedical studies; other applied research
- high-resolution NMR in solids, NMR in liquids, NMR in biosystems
- theory, application, and development of EPR, spin labels and traps, pulsed EPR spectroscopy, high-frequency/high-field EPR and ENDOR, ELDOR, NQR, and other new approaches and methods in EPR and NMR spectroscopy

Approximately 120 scientific participants from around the world are expected to attend the conference.

For additional information, contact Prof. Anatoly Buchachenko, Semenov Institute of Chemical Physics, Russian Academy of Sciences, Kosygin Street 4, Moscow 117977, Russia; E-mail: spinchem@chph.ras.ru; Tel.: +7 095 939 74 90; Fax: +7 095 938 24 84.

NATO Advanced Study Institute (ASI) on Molten Salts: From Fundamentals to Applications, 4–14 May 2001, Kas, Turkey

The scope of this workshop covers fundamental aspects and applications of molten salts, glasses, and metal/molten salt solutions. The Institute will address both high-temperature and low-melting salts, and it will deal with experimental approaches to reveal the microscopic, macroscopic, and dynamic behavior of melts. The role of computer modeling as a link between experiments and theory will be emphasized, as well as the importance of multidisciplinary and multitechnique approaches to unravelling the internal complexity of these technologically important liquids. The need to build up an easily accessible and reliable database will also be stressed.

Specific topics covered at the workshop will include the following: interionic forces and relevant statistical mechanics, diffraction studies, diffusion and transport, thermodynamics and thermochemistry, light scattering, electrochemistry, computer simulations, metal/molten salt solutions, ionic glasses, room-temperature molten salts, batteries, nuclear pyrochemistry, fuel cells, and data in the age of computerized science.

For more information, contact the Institute Secre-

tariat, c/o Joyce Bartolini, IUSTI, Technopôle de Château Gombert, 5 Rue Enrico Fermi, F-13453 Marseille Cedex 13, France; E-mail: molten.salts@iusti.univ-mrs.fr; Tel.: +33 4 91 10 68 82; Fax: +33 4 91 11 74 39.



CHEMRAWN XIV World Conference on Green Chemistry: Toward Environmentally Benign Processes and Products, 9–13 June 2001, Boulder, CO, USA



Collectively we reside on a planet with insufficient natural resources to support profligate consumption. Chemistry plays a key role in increasing the efficiency of resource utilization in the development of products and processes. The key to implementing industrial ecology for a sustainable world is a new mindset that brings pollution prevention and energy conservation to the fore as design principles.

This Chemistry Research Applied to World Needs (CHEMRAWN) XIV Conference, jointly sponsored by IUPAC, the American Chemical Society, and the Green Chemistry Institute, will explore the latest scientific and engineering approaches and develop worldwide strategy and policy recommendations to implement green chemistry. The conference, to be held on the campus of the University of Colorado in Boulder, will bring together world leaders in specific fields to provide a catalyst for the common interests of corporations, academic institutions, government agencies, and representatives of the public interest to determine a path for future action.

Objectives of the conference are to:

- conduct an objective assessment of the technical state-of-the-art in green chemistry and engineering and the contributions it can make to world sustainability;
- define scientific gaps, research priorities, economic and social issues in order to provide decision makers in industry, government, academia, and the non-governmental sector with the knowledge required

to craft policy and accelerate application of green chemistry benefits to world needs; and

- identify and promote an educational program for green chemistry that spans educational levels and national boundaries.

The meeting will consist of invited lectures and contributed posters. Poster papers are solicited on the many topics involving the design of chemical processes and products that will eliminate or reduce the use or generation of hazardous substances. Examples of some specific topics to be discussed include alternative reaction media (e.g., supercritical CO₂) and separations, life cycle impacts, economic opportunities and case studies in large and small companies, environmentally benign food production, emerging biotech-based alternatives, green engineering, social impacts and sustainability, global innovations, green chemistry education, cleaner water and air, and success assessment and measurement. The deadline for abstract receipt is 1 December 2000; abstracts (150 words) should be submitted to Prof. Bob Sievers, Department of Chemistry and Biochemistry, Campus Box 215, University of Colorado, Boulder, CO 80309-0215, USA, on a standard ACS paper abstract form (available on the conference web site, http://cires.colorado.edu/env_prog/chemrawn) or electronically through the web site in the same format to be received at the University of Colorado by the deadline.

Scientists and policy makers from throughout the world will gather in Boulder to discuss sustainability issues, which may be addressed and improved by chemical research and wise policy development and implementation. Nobel Laureate Paul Crutzen of the Max Planck Institute in Mainz, Germany has agreed to give a plenary lecture. Other plenary speakers who have been invited and have tentatively accepted include Michael Fitzpatrick (Rohm and Haas), Joseph DiSimone (University of North Carolina), Zhu Qing Shi (Hefei, China), Joe Miller (duPont), Martyn Poliakopf (Nottingham, UK), Roger Beachy (Danforth Institute), Joe Thornton (author of *Pandora's Poison*, Columbia University), Neal Lane (President Clinton's Science Advisor), and Mary Good (President of AAAS). Additional information about the program and on-line registration will be available on the conference web site: http://cires.colorado.edu/env_prog/chemrawn.

Partial subsidy of the registration fee for students and limited support of travel by developing country scientists may be applied for from the conference organizers.

Approximately 900 scientific participants from around the world are expected to attend this conference.

For additional information, contact Dr. Dennis L.

Hjeresen, Senior Program Manager, Environmental Management Programs, Los Alamos National Laboratory, Mail Stop J591, Los Alamos, NM 87545, USA; E-mail: dennish@lanl.gov; Tel.: +1 505 665 7251; Fax: +1 505 665 8118; Web site: http://cires.colorado.edu/env_prog/chemrawn/enter.html.

International Conference on Dynamical Processes in Excited States of Solids (DPC'01), 1–4 July 2001, Lyon, France



DPC'01 is a cross-disciplinary meeting for physicists, chemists, life scientists, and materials scientists interested in theoretical and experimental aspects of the dynamics of excited states in condensed matter. Basic as well as applied science aspects will be covered. The meeting will be limited to about 150 scientific participants, and all oral and poster sessions will be plenary.

Emphasis at DPC'01 will be on the underlying fundamental aspects of the following topics: dynamics of highly excited states of solids, energy transfer and exciton dynamics, electroluminescence, electron–phonon interaction and phonon dynamics, photoinduced large amplitude motions, cooperative motions, phase transitions, quantum optics, coherent and nonlinear spectroscopy, ultrafast phenomena, and spectroscopy of nanoscale and single nano objects.

For further information, contact Conference Secretariat, c/o Chantal Iannarelli, Congrès Scientifiques Services, 2 Rue des Villarmains, F-92210 Saint-Cloud, France; E-mail: c2s@club-internet.fr; Tel.: +33 1 47 71 90 04; Fax: +33 1 47 71 90 05; or Scientific Secretariat, c/o Marie-France Joubert, LPCML, UMR 5620 CNRS, Université Claude Bernard Lyon 1, Bât. 205 43, boulevard du 11 novembre 1918, F-69622 Villeurbanne cedex France; E-mail: joubert@pcml.univ-lyon1.fr; Tel.: +33 4 72 44 83 39; Fax: +33 4 72 43 11 30; Web site: <http://pcml.univ-lyon1.fr/DPC01/welcome.html>.

European Symposium on Organic Reactivity (ESOR 8), 2–6 August 2001, Dubrovnik, Croatia

For more information, please contact Prof. Mirjana Eckert-Maksic, Rudjer Boskovic Institute, Chemistry Department, Bijenicka c. 54, 10001 Zagreb, Croatia.

International Workshop/Conference on Coupled, Hyphenated, and Multidimensional Liquid Chromatographic Procedures for Separation of Macromolecules, 9–13 September 2001, Bratislava, Slovak Republic

This meeting, organized by the Polymer Institute of the Slovak Academy of Sciences and the Slovak Society of Industrial Chemistry, will bring together researchers from West and East working in both academic and industrial laboratories that are engaged in separation techniques aimed at characterization of synthetic and natural macromolecules. Current developments in separation methods and their applications will be discussed, including recent progress in the characterization of industrial polymeric materials and complex macromolecular systems such as copolymers, polymer blends, and functionalized macromolecules.

Specific topics will include the following:

- coupling of different separation mechanisms within one single liquid chromatographic (LC) column
- hyphenation of various LC detectors, as well as combination of LC with nonchromatographic techniques (mass spectrometry, NMR and IR spectrometry, etc.)
- two- and multidimensional LC of complex polymers: combination of two or several independent LC systems

For additional information, contact Organizing Committee 2001, c/o Prof. Dusan Berek, Polymer Institute of the Slovak Academy of Sciences, Dubravska cesta 9, SK-842 36 Bratislava, Slovakia; E-mail: upolconf@savba.sk or upoldber@savba.sk; Tel.: +421 7 5477 1641; Fax: +421 7 5477 5923 or +421 7 5477 7409; Web site: <http://nic.savba.sk/~upoldber/>.

9th International Conference on Correlation Analysis in Chemistry (CAIC-IX), 9–14 September 2001, Borówno (Bydgoszcz), Poland



This conference, organized under the auspices of the International Group for Correlation Analysis in Chemistry (an Associated Organization of IUPAC), will cover structure–activity relations, structure–reactivity correlations, structure–physical property relationships, spectral properties, substituent effects, solvent and medium effects, weak molecular interactions,

macromolecular systems, and molecular modeling. Two roundtable discussions will be held on past, present, and future of (1) correlation analysis in chemistry and (2) solvent effects.

For more information, please contact Dr. Ryszard Gawinecki, Department of Chemistry, Technical and Agricultural University, Seminaryjna 3, PL-85-326 Bydgoszcz, Poland; E-mail: gawiner@chem.atr.bydgoszcz.pl; Tel.: +48 052 3792900; Fax: +48 052 3731160.

Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

NEW designates a new conference since the last issue.

2000

Food Packaging

8–10 November 2000
2nd International Symposium on Food Packaging—Ensuring the Safety and Quality Food, Vienna, Austria.

Liên-Anh Tran, ILSI Europe, 83, Avenue E. Mounier, Box 6, B-1200, Brussels, Belgium.
Tel.: +32 (2) 771 0014
Fax: +32 (2) 762 0044
E-mail: anh@ilsieurope.be

Polymers

20–24 November 2000
7th Latin-American Symposium on Polymers (SLAP'2000) and 5th Ibero American Congress on Polymers, Havana, Cuba.
Dr. Ricardo Martínez, Dr. Waldo Argüelles-Monal, IMRE,

Universidad de La Habana
La Habana 10400, Cuba.
Fax: +53 7 33 42 47
E-mail: slap@imre.oc.uh.cu

2001

Polymer Characterization

9–12 January 2001
9th International Conference on
Polymer Characterization
(POLYCHAR), Denton, Texas,
USA.
*Dr. Witold Brostow, Department
of Materials Science, University
of North Texas, Denton, Texas,
76203-5310 USA.*
*Tel.: +1 940 565 4358, -3262, or
4337*
Fax: +1 940 565 4824
*E-mail: brostow@unt.edu or
polychar@marta.phys.unt.edu*

Green Chemistry

10–13 January 2001
International Symposium on
Green Chemistry, Delhi, India.
*Dr. M. Kidwai, Organizing
Convenor, Department of Chemis-
try, University of Delhi
Delhi 110007, India*
Tel.: +91 11 725 6235
Fax: +91 11 725 6250
*E-mail:
mkidwai@mantraonline.com*

Macromolecules

9–11 April 2001
4th Annual UNESCO School and
South African IUPAC Conference
on Macromolecules and Materials
Science, Johannesburg, South
Africa.
*Prof. R. D. Sanderson, UNESCO
Associated Centre for Macromol-
ecules and Materials, Institute for
Polymer Science, University of
Stellenbosch, Private Bag X1,
Matieland 7602, South Africa*
Tel.: +27 21 808 3172
Fax: +27 21 808 4967
E-mail: rds@maties.sun.ac.za

Chemistry and Chemical Engineering

16–20 April 2001
IV International Congress on
Chemistry and XIII Caribbean
Conference on Chemistry and
Chemical Engineering, Havana,
Cuba.
*Prof. Alberto J. Núñez Sellés,
Sociedad Cubana de Química,
Ave 21&200, Atabey, Apdo.
16042, CP 11600, Havana, Cuba.*
Tel.: +537 218 178
Fax: +537 336 471
E-mail: cqf@cqf.co.cu

Free-Radical Polymerization

3–8 June 2001
3rd International Symposium on
Free-radical Polymerization:
Kinetics and Mechanism, Lucca,
Italy.
*Prof. M. Buback, Institute for
Physical Chemistry, University of
Göttingen, Tammannstr. 6, D-
37077 Göttingen, Germany*
Tel: +49 551 393141
Fax: +49 551 393144
E-mail: mbuback@gwdg.de

CHEMRAWN XIV

9–13 June 2001
Chemrawn Conference—Toward
Environmentally Benign Pro-
cesses and Products,
Boulder, Colorado, USA.
*Dr. Dennis L. Hjeresen, Environ-
mental Management Program,
Los Alamos National Laboratory
- Mail Stop J591, Los Alamos,
NM 87545.*
Tel.: +1 505 665 7251
Fax: +1 505 665 8118
E-mail: dennish@lanl.gov

Polymer Dispersions

25–28 June 2001
15th International Conference on
Polymers: Preparation of Non-
Conventional Polymer Disper-
sions, Smolenice, Slovak Repub-
lic.
*Prof. Ignac Capek, Polymer
Institute, Slovak Academy of
Sciences, SR-842-36 Bratislava,*

How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsor-
ship, conference organizers
should complete an Advance In-
formation Questionnaire (AIQ).
The AIQ form is available at
<http://www.iupac.org> or by re-
quest at the IUPAC Secretariat,
and should be returned between
2 years and 12 months before
the conference. Further informa-
tion on granting sponsorship is
included in the AIQ and avail-
able online.

Slovak Republic
Tel.: +421 7 5477 2469
Fax: +421 7 5477 5923
E-mail: upolign@savba.sk

IUPAC 41st General Assembly

29 June–8 July 2001
Brisbane, Australia.
IUPAC Secretariat.
Tel.: +1 919 485 8700
Fax: +1 919 485 8706
E-mail: secretariat@iupac.org

IUPAC 38th Congress/World Chemistry Congress 2001

1–6 July 2001
Brisbane, Australia.
*Congress Secretariat, P.O. Box
177, Red Hill Q 4054, Australia.*
Tel.: +61 7 3368 2644
Fax: +61 7 3369 3731
E-mail: wcc2001@ccm.com.au

Coordination and Organometallic Chemistry of Germanium, Tin, and Lead

8–12 July 2001
10th International Conference on
the Coordination and Organome-
tallic Chemistry of Germanium,
Tin, and Lead, Talence, France.
*Dr. B. Jousseume, Laboratoire
de Chimie Organique et
Organometallique, UMR 5802,
Universite Bordeaux 1, 351
avenue de la Liberation, F-33405
Talence Cedex, France.*

Tel.: +33 (0) 5 56 84 64 43
Fax: +33 (0) 5 59 84 69 94
E-mail: b.jousseau@lcoo.u-bordeaux.fr

Scattering Methods and Polymers

9–12 July 2001
20th Discussion Conference on Scattering Methods for the Investigation of Polymers, Prague, Czech Republic.
Dr. Drahomir Vyprachticky, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nam. 2, CZ-162 06 Praha 6, Czech Republic.
Tel.: +420 2 204 0332
Fax: +420 2 367 981
E-mail: sympo@imc.cas.cz

Plasma Chemistry

9–13 July 2001
15th International Symposium on Plasma Chemistry (ISPC-15), Orléans, France.
Prof. Jean-Michel Pouvesle, Laboratoire GREMI, Université d'Orléans, BP 6744, Orléans Cedex 2, France
Tel.: +33 (0) 2 38417124
Fax: +33 (0) 2 38417154
E-mail: jean-michel.pouvesle@univ-orleans.fr

Polymer Membranes

16–19 July 2001
41st Microsymposium on Polymer Membranes, Prague, Czech Republic.
Dr. Drahomir Vyprachticky, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nam. 2, CZ-162 06 Praha 6, Czech Republic.
Tel.: +420 2 204 0332
Fax: +420 2 367 981
E-mail: sympo@imc.cas.cz

Organometallic Chemistry

22–26 July 2001
11th IUPAC International Symposium on Organometallic Chemistry Directed

Towards Organic Synthesis (OMCOS 11), Tapei, Taiwan.
Prof. Tien-Yau Luh, Department of Chemistry, National Taiwan University, Tapei 106, Taiwan.
Tel.: +886 2 23636288
Fax: +886 2 23644971
E-mail: tyluh@ccms.ntu.edu.tw

Phosphorus Chemistry

29 July–3 August 2001
15th International Conference on Phosphorus Chemistry, Sendai, Japan.
Prof. Masaaki Yoshifuji, Department of Chemistry, Graduate School of Science, Tohoku University, Aoba, Sendai 980-8578, Japan.
Tel.: +81 22 217 6558
Fax: +81 22 217 6562
E-mail: yoshifuji@mail.cc.tohoku.ac.jp

Analytical Sciences

6–10 August 2001
International Congress on Analytical Sciences 2001 (ICAS2001), Tokyo, Japan.
Prof. Tsuguo Sawada, Chairman, Department of Applied Chemistry, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan.
Tel.: +81 3 5841 7236 (or 7237)
Fax: +81 3 5841 6037
E-mail: icas2001@laser.t.u-tokyo.ac.jp

Solution Chemistry

26–31 August 2001
27th International Conference on Solution Chemistry (27ICSC), Vaals, Netherlands.
Dr. Christian Dux, Conference Secretary of 27th ICSC, Institute of Physical Chemistry, RWTH-Aachen, D-52062, Aachen, Germany
Tel.: +49 241 80 4752 or +49 241 80 4712
Fax: +49 241 8888 327 or +49 241 8888 128
E-mail: 27icsc@liquid.pc.rwth-aachen.de

Ionic Polymerization

22–26 October 2001
4th International Symposium on Ionic Polymerization, Crete, Greece.
Dr. Nikos Hadjichristidis, University of Athens, Department of Chemistry, Panepistimiopolis, Zografou, GR-157 71 Athens, Greece
Tel.: +30 1 724 9103
Fax: +30 1 722 1800
E-mail: hadjichristidis@chem.uoa.gr

Biodiversity

3–8 November 2001
3rd IUPAC International Conference on Biodiversity (ICOB-3), Antalya, Turkey.
Prof. B. Sener, Department of Pharmacognosy, Faculty of Pharmacy, Gazi University, P.O. Box 143 06572, Maltepe-Ankara, Turkey.
Tel.: +90 312 212 2267
Fax: +90 312 213 3921
E-mail: blgsener@tr-net.net.tr

Sweeteners

13–17 November 2001
2nd International Symposium on Sweeteners, Hiroshima-Shi, Japan.
Prof. Kasuo Yamasaki, Institute of Pharmaceutical Sciences, Faculty of Medicine, Hiroshima University Kasumi, Minami-ku, Hiroshima 734-8551, Japan.
Tel.: +81 82 257 5285
Fax: +81 82 257 5289
E-mail: yamasaki@pharm.hiroshima-u.ac.jp

2002

Polymer Characterization

7–11 January 2002
10th International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.
Dr. Witold Brostow, Department

of Materials Science, University
of North Texas, Denton, Texas,
76203-5310 USA
Tel.: +1 940 565 4358, -3262, or
4337
Fax: +1 940 565 4824
E-mail: brostow@unt.edu or
polychar@marta.phys.unt.edu

Chromatography

6–8 February 2002
7th International Symposium on
Hyphenated Techniques in
Chromatography and Hyphenated
Chromatographic Analyzers
(HTC-7), Bruges, Belgium.
*This conference has declined
IUPAC sponsorship.*

Macromolecules

6–10 February 2002
5th Annual UNESCO School and
South African IUPAC Conference
on Macromolecules and Materials
Science, Stellenbosch, South
Africa.
Prof. R. D. Sanderson, UNESCO
Associated Centre for Macromol-
ecules and Materials, Institute for
Polymer Science, University of
Stellenbosch, Private Bag X1,
Matieland 7602, South Africa
Tel.: +27 21 808 3172
Fax: +27 21 808 4967
E-mail: rds@maties.sun.ac.za

Macromolecules

7–12 July 2002
39th International Symposium on
Macromolecules - IUPAC World
Polymer Congress 2002 (MACRO
2002), Beijing, China.
Prof. Fosong Wang, The Chinese
Academy of Sciences, Beijing
100864, China
Tel: +86 10 62563060
Fax: +86 10 62573911
E-mail: fswang@mimi.cnc.ac.cn

Organic Synthesis

14–19 July 2002
14th International Conference on
Organic Synthesis (ICOS-14),
Christchurch, New Zealand.
Prof. Margaret A. Brimble,
Department of Chemistry,
University of Auckland, 23
Symonds St., Auckland, New
Zealand
Tel.: +64 9 373 7599, Ext. 8259
Fax: +64 9 373 7422
E-mail:
m.brimble@auckland.ac.nz

Chemical Thermodynamics

28 July–2 August 2002
17th IUPAC Conference on
Chemical Thermodynamics,
Rostock, Germany.
Prof. A. Heintz, FB Chemie,
Universitat Rostock, Hermannstr.
14, D-18051 Rostock, Germany
Tel.: +49 381 498 1852
Fax: +49 381 498 1854
E-mail:
andreas.heintz@chemie.uni-
rostock.de

Crop Protection

4–9 August 2002
10th IUPAC International Con-
gress on the Chemistry of Crop
Protection (formerly International
Congress of Pesticide Chemistry),
Basel, Switzerland.
Dr. Bernard Donzel, c/o Novartis
CP AG, WRO-1060.3.06, CH-
4002 Basel, Switzerland
Tel.: +41 61 697 22 67
Fax: +41 61 697 74 72
E-mail:
bernard.donzel@cp.novartis.com

Bioorganic Chemistry

11–14 August 2002 (*new dates!!*)
6th International Symposium on
Bioorganic Chemistry (ISBOC-6),
Toronto, Canada.
Dr. Ronald Kluger, Department of
Chemistry, University of Toronto,
Toronto, Canada M5S 3H6.
Tel.: +1 416 978 3582
Fax.: +1 416 978 3482
E-mail:
rkluger@chem.utoronto.ca

Visas

It is a condition of sponsor-
ship that organizers of meet-
ings under the auspices of
IUPAC, in considering the lo-
cations of such meetings,
should take all possible steps
to ensure the freedom of all
bona fide chemists from
throughout the world to at-
tend irrespective of race, re-
ligion, or political philoso-
phy. IUPAC sponsorship im-
plies that entry visas will be
granted to all bona fide
chemists provided applica-
tion is made not less than
three months in advance. If a
visa is not granted one month
before the meeting, the
IUPAC Secretariat should be
notified without delay by the
applicant.

Polymer Science and Technology

2–5 December 2002
IUPAC Polymer Conference on
the Mission and Challenges of
Polymer Science and Technology,
Kyoto, Japan.
Prof. Seiichi Nakahama, Faculty
of Engineering, Tokyo Institute of
Technology, 2-12-1 Ohokayama,
Meguro-ku, Tokyo 152-8552,
Japan.
Tel.: +81 3 5734 2138
Fax.: +81 3 5734 2887
E-mail:
snakaham@polymer.titech.ac.jp

Index

Awards and Prizes

American Chemical Society Herman Skolnik Award (Stephen R. Heller), 25
American Chemical Society Division of Medicinal Chemistry Award (Lester A. Mitscher), 116
American Chemical Society Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (Ram Lamba), 43
"Honoris Causa" from University of Milan (Upendra Pandit), 43
Maison de la Chimie Foundation Prize (Guy Ourisson), 43
Royal Australian Chemical Institute H. G. Smith Memorial Medal (Milton T. W. Hearn), 115
Royal Society Foreign Member (Ronald Breslow), 145
Royal Society of Chemistry, Robert Boyle Medal (William Horwitz), 178
Royal Society of Chemistry Award for Organic Reaction Mechanisms (Thomas T. Tidwell), 25
Thieme-IUPAC Prize in Synthetic Organic Chemistry (Alois Fürstner), 115

Conference Announcements

Analytical Chemistry, 6th Polish Conference on, 91
AOAC International Annual Meeting and Exposition, 114th, 121
AOCS/JOCS Joint Meeting 2000, 92
Atmospheric Deposition and Impacts on Ecosystems with Particular Reference to the Mideast, IUPAC Workshop on, 27
Atomic Spectrometry, 6th Rio Symposium on, 181
Bioorganic Chemistry (ISBOC-6), 6th International Symposium on, 125
Carbohydrates, 6th European Training Course on, 91
Chemical Measurement and Monitoring of the Environment (EnviroAnalysis 2000), 3rd Biennial International Conference on, 90
Chemical Safety (IFCS), Forum III of the Intergovernmental Forum on, 29
Chemical Thermodynamics, 17th IUPAC Conference on, 156
Chemistry into the New Millennium: 11th Royal Australian Chemical Institute Convention (11RACIC), 25
CHEMRAWN XIV World Conference on Green Chemistry: Toward Environmentally Benign Process and Products, 183
Chlorine Symposium, 2000 London International, 27
Chromatography and Hyphenated Chromatographic Analyzers, 7th International Symposium on Hyphenated Techniques in (HTC-7), 155
CODATA Molten Salt Working Group Workshop on Building Information on Molten Salts, 91
Committee on Space Research (COSPAR) Scientific Assembly, 33rd, 28
Correlation Analysis in Chemistry, 9th International Conference on (CAIC-IX), 185
Crop Protection, 10th IUPAC International Congress on the Chemistry of, 157
Dietary Fibre 2000 (Sponsored by ICC/AOAC International), 90
Dynamical Processes in Excited States of Solids, International Conference on (DPC'01), 184

Emulsion Polymerization and Latex Technology, 31st
Annual Short Course on Advances in, 28
Environmental Analytical Chemistry (30th ISEAC), 30th
Annual International Symposium on, 90
Environmental Health, 6th World Congress on, 60
Food BioPack Conference: Production and Application of Biobased Packaging Materials for the Food Industry, 91
Free-Radical Polymerization: Kinetics and Mechanisms, 3rd
International Symposium on, 154
Frontiers in Chemistry/World Chemistry Congress 2001, 38th IUPAC Congress, 123
Genomics, 2nd International Conference on, 26
Germanium, Tin, and Lead, 10th International Conference on the Coordination and Organometallic Chemistry of, 124
Green Chemistry, International Symposium on, 153
Hazards XV—The Process, its Safety, and the Environment—Getting it Right, 26
Heteroatom Chemistry (ICHAC-6), 6th International Conference on, 123
IMEKO World Congress, 16th, 122
Ionic Polymerization, 4th International Symposium on, 155
Liquid Chromatographic Procedures for Separation of Macromolecules, International Workshop/Conference on Coupled, Hyphenated, and Multidimensional, 185
Luminescence Spectrometry in Biomedical and Environmental Analysis—Spectroscopic and Imaging Detection Techniques, 9th International Symposium on, 90
Macro- and Supramolecular Architectures and Materials (MAM-01): Biological and Synthetic Systems, 1st
International Symposium on, 182
Macromolecules and Materials Science, 4th Annual UNESCO School and South African IUPAC Conference on, 153
Macromolecules and Materials Science, 5th Annual UNESCO School and South African IUPAC Conference on, 155
Macromolecules, IUPAC World Polymer Congress 2002—39th International Symposium on, 156
Magnetic Resonance in Chemistry and Biology, 11th
International Conference on, 182
Membrane Technology in Water and Wastewater Treatment, 26
Metrology—Trends and Applications in Calibration and Testing Laboratories, International Conference on, 26
Molten Salts: From Fundamentals to Applications, NATO Advance Study Institute (ASI) on, 183
Organic Reactivity, European Symposium on (ESOR 8), 185
Organic Synthesis, 14th International Conference on (ICOS-14), 156
Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS 11), 11th IUPAC International Symposium on, 124
Pesticides 2000: Harmonization of Pesticide Management—Regulation, Monitoring, and Evaluation, IUPAC-Taiwan Agricultural Chemicals and Toxic Substances Research Institute, Council of Agriculture (TACTRI/COA) International Workshop on, 28
Photophysics and Photochemistry (PP 2000), International Conference on, 60

Plasma Chemistry, 15th International Symposium on (ISPC-15), 154
 Polymer Applications and Theory and Short Course on Polymer Characterization (POLYCHAR-9), World Forum on, 122
 Polymer Characterization (POLYCHAR-10), 10th International Conference on, 125
 Polymers: Preparation of Nonconventional Polymer Dispersions, 15th Bratislava International Conference on, 154
 Raman Spectroscopy (ICORS 2000), 17th International Conference on, 60
 Reference Materials for Technologies in the New Millennium, 26
 Scientific Committee on Antarctic Research (SCAR), 26th, and Council of Managers of National Antarctic Programs (COMNAP), 12th, 28
 Solar Energy and Applied Photochemistry, 6th International Conference on, 181
 Solution Chemistry (27ICSC), 27th International Conference on, 60
 Thermochemical, Thermodynamic, and Transport Properties of Halogenated Hydrocarbons and Mixtures, 2nd International Workshop on, 153
 Toxicology, Advanced Principles of, 59
 Transgenic Crops, Practical Experiences in the Use of, 25
 World Polymer Congress 2002, 156

Conference Calendar

Listings of IUPAC-Sponsored Conferences and Symposia, 29, 61, 92, 125, 157, 185

Featured Articles

Air Quality in Denmark, 133
 An Outlook for Chemistry in Chile in 2000, 129
 Chemistry in Argentina, 97
 Chemistry in Slovenia, 65
 Environmental Problems of Greece from a Chemical Point of View, 1

IUPAC

Atmospheric Deposition and its Impact on Ecosystems, with Reference to Mideast Region, Overview of International Symposium on, 168
 Chemical Nomenclature, 34
 Chemical Nomenclature Round Table, 102
Chemistry International Strategy Development Committee, 103
 Codex Committee on Pesticide Residues (CCPR), Report on 32nd Meeting of, 163
 Coding Scheme for Properties in Laboratory Medicine, 171
 Commemorative Periodic Table, 161
 Committee on Reference Materials (REMCO) of the International Organization for Standardization (ISO), Report on the 23rd Meeting of, 167
 Consultative Committee for Amount of Substance (CCQM), Report on 2000 Annual Meeting of, 163
 Definitions of Terms Relating to Polymers and Functional Polymers, New Project on, 81
 DIDACTic Tools for Teaching Chemistry, 103
 Education Strategy Development Committee (ESDC), 33
 Environmental Analytical Chemistry for Regulatory Chemists and Laboratory Managers, International Organization for Chemical Sciences in Development (IOCD)/IUPAC Workshop on, 34
 Environmental Analytical Chemistry—Problems Related in Part to Mining in Africa, New Project on, 81

EURACHEM 10th Anniversary Meeting and EURACHEM Full Committee Meeting, 35
 Financial Condition for the Biennium 1998–1999, Report on IUPAC's, 109
 Glossary of Terms Relating to Polymeric Gels and Networks, Hybrid Inorganic Polymeric Materials, and the Processing Thereof, New Project on 143
 Highlights from the Web, 136
 International Program on Chemical Safety (IPCS) Program Advisory Committee, IUPAC Observer's Report on the Ninth Meeting of, 7
 IUPAC-Industry Relations, 33
 IUPAC-NIST Solubility Data Series, 108
 IUPAC Prize for Young Chemists, 132
 Japanese Version of IUPAC, IUPHAR, and IUTOX Report on Natural and Anthropogenic Environmental Oestrogens: The Scientific Basis for Risk Assessment, 7
 Letter to the Editor, 85
 Loening, Kurt L., Obituary, 172
 Measurement Uncertainty, International Bureau of Weights and Measures (BIPM)—Consultative Committee for Amount of Substance (CCQM), Working Group Meeting and Workshop on, 76
 Method Validation, Principles and Practices of, FAO/IAEA/AOAC International/IUPAC Workshop on, 71
 Millennium Message, 1
 Molecular Basis of Biodiversity: Conservation and Sustained Innovative Utilization, ICSU/IUPAC Southeast Asian Workshop on, 74
 Mycotoxin Methods for Developing Countries—Aflatoxins in Paprika, Corn, Pistachios, Peanuts, and Figs, New Project on, 81
 New Projects, 81, 141, 174
 Periodic Table, 161
 Pesticide Residues, Report on 32nd Codex Committee Meeting on (CCPR), 163
 Polyaniline: Recommendations for Preparation of Conducting Polymer and Its Colloidal Form, New Project on 141
 Polymers and Functional Polymers, New Project on Definitions of Terms Relating to, 81
Pure and Applied Chemistry: The Special Topics Project, 105
 Reference Materials, Report on the 23rd Committee Meeting (REMCO) of the International Organization for Standardization (ISO), 167
 Round-Robin Test on the Molecular Characterization of Epoxy Resins by Liquid Chromatography, New Project on, 141
 Soil and Water Bioremediation: *In-Situ* Treatment of Polluted Soil and Water with Emphasis on the Use of Genetically Engineered Microorganisms, New Project on, 174
 Solubility Phenomena—Applications for Environmental Improvement, New Project on, 142
 Strategy for Educational Policy, 70
 Structure and Properties of Cyclic Olefin Copolymers, New Project on, 142
 Symposia and Conferences in Developing and Economically Disadvantaged Countries, 107
 Terminology of Polymers with Ionizable Groups and Polymers Containing Ions, New Project on, 143
 Thermochemical, Thermodynamic, and Transport Properties of Halogenated Hydrocarbons and Mixtures, Report on First Workshop on, 162
 Thieme-IUPAC Prize in Synthetic Organic Chemistry (Alois Fürstner), 115

Meeting Reports

- Atmospheric Deposition and its Impact on Ecosystems, with Reference to Mideast Region, Overview of International Symposium on, 168
- Codex Committee on Pesticide Residues (CCPR), Report on 32nd Meeting of, 163
- Committee on Reference Materials (REMCO) of the International Organization for Standardization (ISO), Report on 23rd Meeting of, 167
- Consultative Committee for Amount of Substance (CCQM), Report on 2000 Annual Meeting of, 163
- Environmental Analytical Chemistry for Regulatory Chemists and Laboratory Managers, International Organization for Chemical Sciences in Development (IOCD)/IUPAC Workshop on, 34
- EURACHEM 10th Anniversary Meeting and EURACHEM Full Committee Meeting, 35
- International Program on Chemical Safety (IPCS) Program Advisory Committee, IUPAC Observer's Report on the Ninth Meeting of, 7
- Measurement Uncertainty, International Bureau of Weights and Measures (BIPM)–Consultative Committee for Amount of Substance (CCQM), Working Group Meeting and Workshop on, 76
- Method Validation, Principles and Practices of, FAO/IAEA/AOAC International/IUPAC Workshop on, 71
- Molecular Basis of Biodiversity: Conservation and Sustained Innovative Utilization, ICSU/IUPAC Southeast Asian Workshop on, 74
- Pesticide Residues, Report on 32nd Codex Committee Meeting on (CCPR), 163
- Reference Materials, Report on the 23rd Committee Meeting (REMCO) of the International Organization for Standardization (ISO), 167
- Thermochemical, Thermodynamic, and Transport Properties of Halogenated Hydrocarbons and Mixtures, Report on First Workshop on, 162

News and Notices from Other Societies and Unions

- Academies to Provide Science Advice to World Leaders (The Royal Society), 144
- Formulating International Ethical Guidelines for Science (ICSU-SCRES), 174
- Morbidity and Mortality of Scientific Illiteracy, 11
- New www.royalsoc.ac.uk (The Royal Society), 144
- Report of First Annual Meeting of National Authority Representatives and First Meeting of Chemical Industry Representatives Organization for the Prohibition of Chemical Weapons (OPCW), 13
- West African Chemical Society: A Catalyst for the Development of African Science, 36

Prizes and Awards

See Awards and Prizes

Provisional Recommendations

- Definitions Relating to Stereochemically Asymmetric Polymerizations (Commission on Macromolecular Nomenclature, IV.1), 179
- Generic Source-Based Nomenclature for Polymers (Commission on Macromolecular Nomenclature, IV.1), 150
- Names for Muonium Atoms and Ions (Commission on Nomenclature of Inorganic Chemistry, II.2), 114
- Nomenclature of Structural and Compositional Characteristics of Ordered Microporous and Mesoporous Materials

with Inorganic Hosts (Commission on Colloid and Surface Chemistry Including Catalysis, I.6), 90

Retention Parameters in Gas Chromatography (Commission on Separation Methods in Analytical Chemistry, V.3), 151

The Hold-Up Volume Concept in Column Chromatography (Commission on Separation Methods in Analytical Chemistry, V.3), 151

Publications

- Aliphatic Compounds C₃–C₁₃ with Water, IUPAC-NIST Solubility Data Series 68 (*Journal of Physical and Chemical Reference Data*, American Chemical Society and American Institute of Physics), 119
- Biodiversity, Biotechnology, and Sustainable Development in Health and Agriculture: Emerging Connections (Pan American Health Organization), 45
- Cancer Pain Relief and Palliative Care in Children (WHO), 50
- Carbon Tetrachloride, Environmental Health Criteria No. 208 (WHO), 47
- Chemistry, Society, and Environment: A New History of the British Chemical Industry (Royal Society of Chemistry), 120
- Copper, Environmental Health Criteria No. 200 (WHO), 45
- Czech Edition of "Blue Book": A Guide to IUPAC Nomenclature of Organic Compounds. Recommendations 1993 (Vydala Academia), 148
- Dutch Translation of Section E on Stereochemistry from the IUPAC "Blue Book", Nomenclature of Organic Chemistry, and "Basic Terminology of Stereochemistry" (IUPAC Recommendations 1996) (Koninklijke Nederlandse Chemische Vereniging, KNCV), 117
- Principles and Methods for Assessing Allergic Hypersensitization Associated with Exposure to Chemicals, Environmental Health Criteria No. 212 (WHO), 177
- Environmental Health Services in Europe 4. Guidance on the Development of Educational and Training Curricula, WHO Regional Publications, European Series No. 84 (WHO), 51
- Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry, Organic Species: Supplement VII (*Journal of Physical and Chemical Reference Data*, American Chemical Society and American Institute of Physics), 118
- Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry, Halogen Species: Supplement VIII (*Journal of Physical and Chemical Reference Data*, American Chemical Society and American Institute of Physics), 150
- Flame Retardants: Tris(chloropropyl) Phosphate and Tris(2-chloroethyl) Phosphate, Environmental Health Criteria No. 209 (WHO), 48
- Food Safety Issues Associated with Products from Aquaculture, Report of a Joint FAO/NACA/WHO Study Group, Technical Report Series No. 883 (WHO), 48
- French Translation of IUPAC "Gold Book", Compendium of Chemical Terminology, 2nd Edition (Editions Tec & Doc), 45
- Guide to the Nomenclature of Particle Dispersion Technology for Ceramic Systems, NIST Special Publication 945 (U.S. Department of Commerce), 120
- Guidelines for Preparing Core Clinical-Safety Information on Drugs, 2nd Edition, Including New Proposals for Investigator's Brochures, Report of CIOMS Working Groups III (Revised) and V (New) (WHO), 85
- Halogenated Ethanes and Ethenes with Water, IUPAC-

- NIST Solubility Data Series 67 (*Journal of Physical and Chemical Reference Data*, American Chemical Society and American Institute of Physics), 118
- Health Effects of Interactions between Tobacco Use and Exposure to Other Agents, Environmental Health Criteria No. 211 (WHO), 176
- IUPAC Handbook 2000–2001 (IUPAC), 44
- Japanese Translation of Natural and Anthropogenic Environmental Oestrogens: The Scientific Basis for Risk Assessment (IUPAC, Special Issue of *Pure and Applied Chemistry*), 23
- Macromolecular Symposia, Volume 139: Macromolecules at Interfaces (Wiley-VCH), 85
- Macromolecular Symposia, Volume 143: Macromolecules (Wiley-VCH), 85
- Macromolecular Symposia, Volume 146: Molecular Order and Mobility in Polymer Systems (Wiley-VCH), 145
- Macromolecular Symposia, Volume 147: Mechanical Behavior of Polymeric Materials (Wiley-VCH), 116
- Monitoring Ambient Air Quality for Health Impact Assessment, WHO Regional Publications, European Series No. 85 (WHO), 84
- Pesticide Chemistry and Bioscience: The Food-Environment Challenge (Royal Society of Chemistry), 84
- Polybrominated Dibenzo-p-dioxins and Dibenzofurans, Environmental Health Criteria No. 205 (WHO), 46
- Principles and Methods for Assessing Allergic Hypersensitization Associated with Exposure to Chemicals, Environmental Health Criteria No. 212 (WHO), 177
- Principles for the Assessment of Risks to Human Health from Exposure to Chemicals, Environmental Health Criteria No. 210 (WHO), 84
- Quality Assurance of Pharmaceuticals: A Compendium of Guidelines and Related Materials, Volume 2: Good Manufacturing Practices and Inspection (WHO), 175
- Safe Management of Wastes from Health Care Activities (WHO), 51
- SoLEq: Solution Equilibria, Principles and Applications (Academic Software), 24
- Spanish Translation of the IUPAC “Green Book”, Quantities, Units, and Symbols in Physical Chemistry, 2nd Edition (Editorial Centro de Estudios Ramón Areces), 83
- Teacher’s Guide: Management of Wastes from Health Care Activities (WHO), 52
- Technical Reports and IUPAC Recommendations Published in 1999 Issues of *Pure and Applied Chemistry (PAC)* and Elsewhere, 148
- Ternary Alcohol–Hydrocarbon–Water Systems, IUPAC–NIST Solubility Data Series 69 (*Journal of Physical and Chemical Reference Data*, American Chemical Society and American Institute of Physics), 119
- Organic Mesoscopic Chemistry (IUPAC, Chemistry for the 21st Century Monograph), 23
- WHO Expert Committee on Specifications for Pharmaceutical Preparations, 35th Report, Technical Report Series No. 885 (WHO), 49
- WHO Expert Committee on Biological Standardization, 48th Report, Technical Report Series No. 889 (WHO), 176
- Reports from IUPAC Bodies**
- Chemistry and Human Health Division, 179
- Commission on Agrochemicals and the Environment (VI.4), 89
- Commission on Atmospheric Chemistry (VI.2), 57
- Commission on Atomic Weights and Isotopic Abundances (II.1), 55
- Commission on Biophysical Chemistry (I.7), 55
- Commission on Chemical Kinetics (I.4), 54
- Commission on Electrochemistry (I.3), 113
- Commission on Food (VI.5), 151
- Commission on Macromolecular Nomenclature (IV.1), 88
- Commission on Microchemical Techniques and Trace Analysis (V.2), 57
- Commission on Molecular Structure and Spectroscopy (I.5), 87
- Commission on Nomenclature of Inorganic Chemistry (II.2), 56
- Commission on Nomenclature, Properties, and Units (VII.C.1), 89
- Commission on Photochemistry (III.3), 57
- Commission on Physical Organic Chemistry (III.2), 88
- Commission on Soil and Water Chemistry (VI.3), 58
- Commission on Thermodynamics (I.2), 53
- Commission on Toxicology (VII.C.2), 180
- Physical Chemistry Division Committee, 86
- Reports from IUPAC-Sponsored Symposia**
- Analytical Science into the Next Millennium (SAC 99), 21
- Bioorganic Chemistry (ISBOC-5), 5th International IUPAC Symposium on, 80
- Carotenoids, 12th International Symposium on, 113
- Chemistry and the Internet, 136
- Functional Dyes, 4th International Symposium on, 78
- High-Temperature Materials Chemistry (HTMC-X), 10th International IUPAC Conference on, 139
- Ionic Polymerization (IP’99), IUPAC International Symposium on, 79
- Macromolecule–Metal Complexes (MMC-8), 8th International Symposium on, 41
- Macromolecules and Materials Science, UNESCO Preconference Workshop and UNESCO School and IUPAC Conference on, 137
- Molecular Mobility and Order in Polymer Systems, 3rd International Symposium on, 17
- Mycotoxins and Phycotoxins (10th ISMP), 10th International IUPAC Symposium on, 140
- Nanostructured Systems, 1st IUPAC Workshop on Advanced Materials (WAM-1), 19
- Organic and Organoelement Chemistry, Horizons of, 22
- Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS 10), 10th International Symposium on, 19
- Physical Methods for Catalytic Research at the Molecular Level, International Memorial K. I. Zamaraev Conference on, 18
- Plasma Chemistry (ISPC-14), 14th International Symposium on, 22
- Polymer-Based Technology (POC’2000), 9th International Conference on, 141
- Polymerization Methods: Controlled Synthesis of Functionalized Polymers, Advances in, 39th Microsymposium on, 40
- Rheology of Polymer Systems, 19th Discussion Conference on, 20
- Solution Chemistry, 26th International Conference on (26th ICSC), 21
- Toxicology in Developing Countries (4th CTOX-DC), 4th IUTOX Congress of, 42